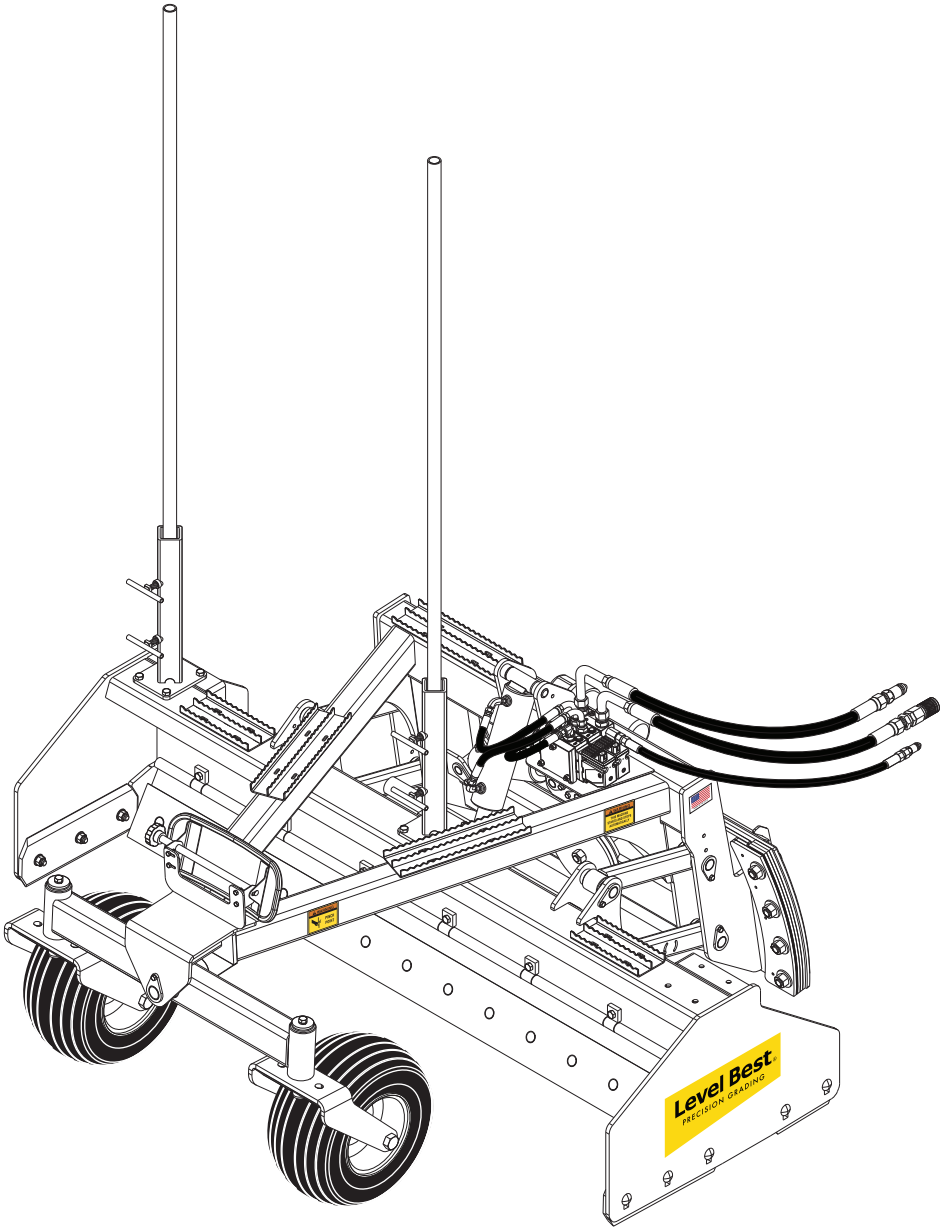
Level Best®
PRECISION GRADING

OPERATORS & PARTS MANUAL

PD - SERIES PARA-LEVEL DUAL



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DISCLAIMER

THE INFORMATION IN THIS MANUAL IS PROVIDED TO PROMOTE THE SAFE USE OF, AND ASSIST THE OPERATOR IN ACHIEVING THE BEST PERFORMANCE FROM, PARA-LEVEL GRADING BOX DESCRIBED HEREIN, FOR THEIR INTENDED APPLICATIONS.

USING THIS DOCUMENT

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WARRANTY

This Level-Best Grading System is designed and manufactured to high standards. ATI Corporation, therefore, guarantees this Level-Best product to be free from defect in workmanship and materials for three (3) years from purchase date. If the machine is to be used for rental purposes the warranty is limited to ninety (90) days.

Components supplied by outside vendors (e.g. cylinders, hydraulic valves and components, electronic modules, and machine control technology systems) are warranted separately by their respective manufacturers. The warranty periods of these components are generally one (1) year from date of purchase.

Neither Level-Best nor hydraulic component manufacturers will cover normal wear or failure due to hydraulic oil contamination from the power source. ALWAYS start with clean oil and filters prior to installation and operation.

Misuse, abuse, misapplication, and unauthorize alterations will void this warranty.

All warranty work must be performed by an authorized Level-Best dealer and authorized by ATI Corporation. All Level-Best parts suspected of failure must be returned to ATI Corporation for warranty analysis prior to any credit being issued.

SAFETY INFORMATION

This manual is furnished to you, the owner/operator, as a guide to get the greatest benefit from your grading box. ATI Corporation wants you to be able to get the most use out of your grading box through safe and efficient operation.

Before attempting to operate the grading box, carefully read all sections of this manual. Be sure that you thoroughly understand all of the safety information and operating procedures.

SAFETY PRECAUTION DEFINITIONS

Dangers, **Warnings**, **Cautions**, and **Notes** are strategically placed throughout this manual to further emphasize the importance of personal safety, qualifications of operating personnel, and proper use of the grading box in its intended application. These precautions supplement and/or complement the safety information decals affixed to the unit and include headings that are defined as follows:

⚠ DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a potentially hazardous situation or practice which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a potentially hazardous situation or practice which, if not avoided, will result in damage to equipment and/or minor injury.

NOTE: Indicates an operating procedure, practice. etc., or portion thereof, which is essential to highlight.

- Always use caution and safe operating practices when operating this equipment.
- Always set the Automatic/Manual Switch on the Control Panel to MANUAL before leaving the operator's seat or whenever the machine is not moving.
- Always allow for clearance under the cutting edge of the machine when tuning the system or when switching to automatic control. Insufficient clearance could cause the machine to lift itself off the ground as its cutting edge attempts to achieve the programmed slope.
- Never adjust the position of the laser receiver when the system is in automatic control.
- Never perform service work on your machine or the Automatic Control System when the system is in automatic control.
- Install all safety panels and guards before operating your equipment.
- Stay clear of all moving parts when the machine is in operation.
- Keep all people clear of the machine when it is running.
- Keep feet and other body parts from under the cutting edges of the machine at all times.
- Read and comply with all safety recommendations of your tractor/skid steer manufacturer, as outlined in its operator and service manuals.

NOTE: References made to left, right, front, and rear are those directions viewed from behind the power unit and grading box.

NOTE: Some equipment depicted in illustrations may not reflect exact production model configurations.

NOTE: All safety, operating, and servicing information reflects current production models at the time of publication of this manual.

NOTE: ATI Corporation reserves the right to discontinue models at any time, change specifications, and improve design without notice and without incurring obligation on goods previously purchased and to discontinue supplying any part listed, when the demand does not warrant production.

(for future use)

OVERVIEW

The Level Best grading box is a cost-efficient method for fine grading. Various capacities sized to fit all sizes of skid steer loaders or compact track loaders (CTL) with a choice of automatic control systems are available.

A typical 2D system provides laser-guided depth control along a plane from a single reference point which must be set up for each job site. A 3D system adds locating ability to the control through either a satellite constellation (GPS) or local positioning system (LPS). The control system not only knows the desired depth on the plane, but the location of the machine on the job site and, in the case of a GPS system, even which job site you are currently on.

The desired blade depth is processed and automatically controls the grading box's hydraulics to maintain the elevation of the cutting edge based on the site plan.

OPERATION

Operation of the grading box and automatic control system is typically in automatic mode. Depending upon the type of CTL, manual override and fine tuning are available through an optional joystick control or buttons on the CTL in-cab controls.

For CTLs equipped with buttons on the in-cab joysticks, Level Best provides a brand specific loader harness. This 14-socket harness plugs into the auxiliary electrical connector on the loader boom and allows for manual control of the grading box as well as interfaces with the control system to switch *Auto/Manual* mode and correct grade offset (*Increment/Decrement*).

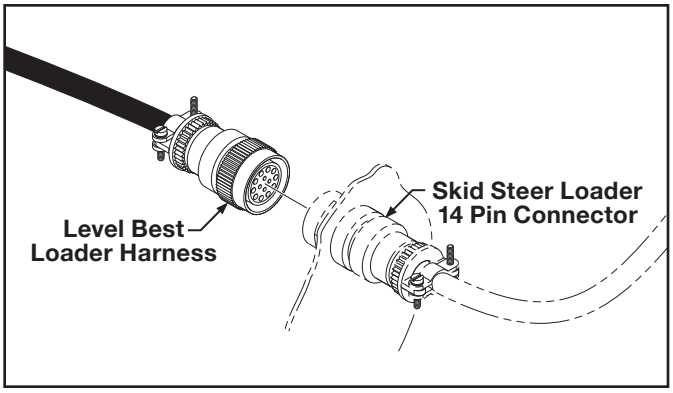


Figure 1-1. Connector 14 - socket

See **Figure 2-1** through **Figure 2-11** starting on Page 2.1 for specific loader brand joystick layouts and corresponding Level Best functions.

For rental and mixed fleet applications or for loaders that do not have the required joystick configuration in the cab, Level Best provides an optional third joystick. This CAN joystick is mounting in the cab with a suction cup and provides full override capabilities of the grading box as well as interfaces with the control system to switch *Auto/Manual* mode and correct grade offset (*Increment/Decrement*).

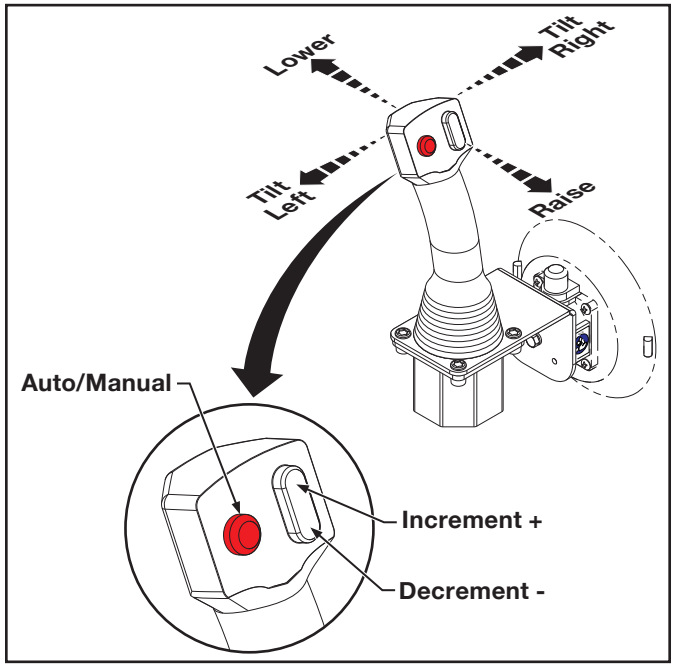
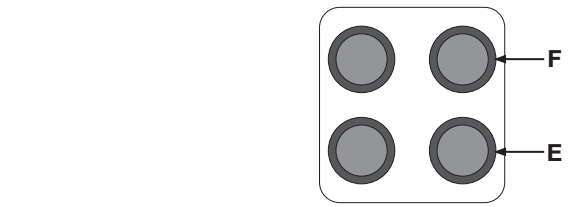
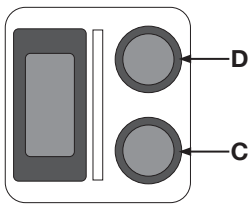


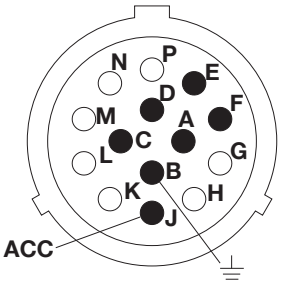
Figure 1-2. Optional Joystick Functions

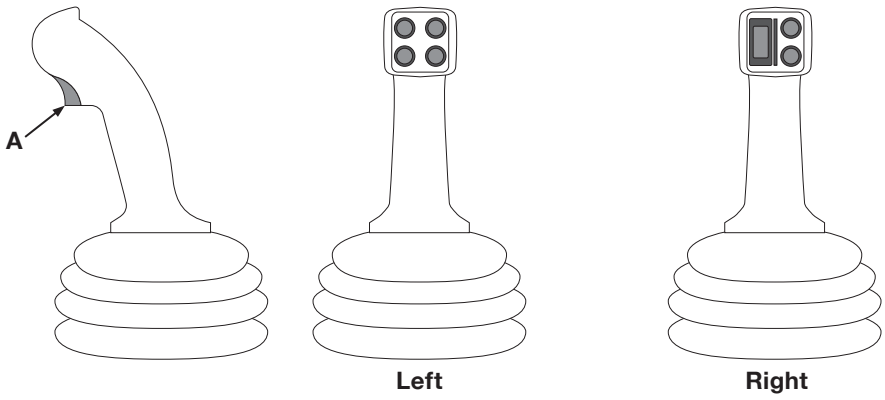
(for future use)





Skid Steer Connection

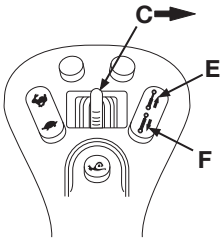


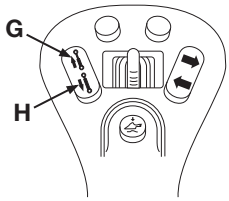


Harness Part Number 000-200-390

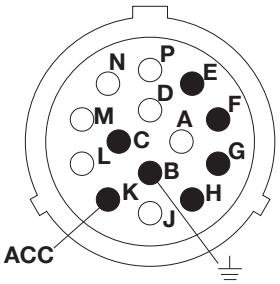
Pin	Level Best Function
F	Left (Elevation) Raise
E	Left (Elevation) Lower
A & F	Right (Slope) Raise
A & E	Right (Slope) Lower
D	Auto/Manual
C	Auto/Manual
A & D	Increment
A & C	Decrement
A	Trigger (Combo)
J	Key Power
B	Ground

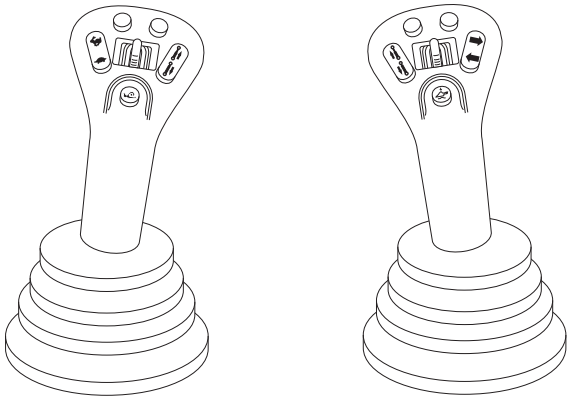
Figure 2-1. Cat D-Series Joystick Functions





Skid Steer Connection



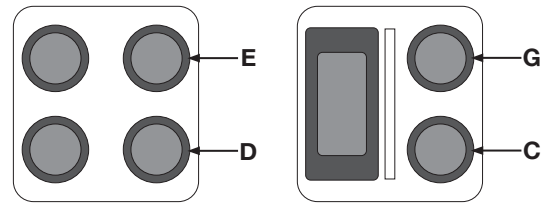


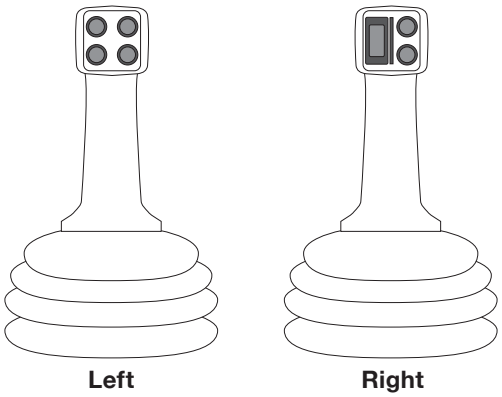
Harness Part Number 000-200-468

Pin	Level Best Function
E	Left (Elevation) Raise
F	Left (Elevation) Lower
E & C	Right (Slope) Raise
F & C	Right (Slope) Lower
G	Auto/Manual
H	Auto/Manual
G & C	Increment
H & C	Decrement
C	Combo
K	Key Power
B	Ground

NOTE: Requires Bobcat 14-Pin Connector Kit (P/N 6733136)

Figure 2-2. Bobcat Joystick Functions





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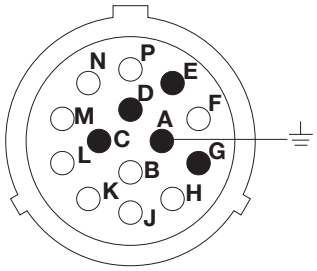
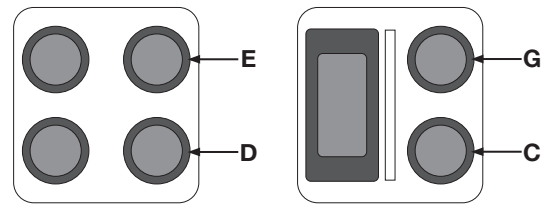


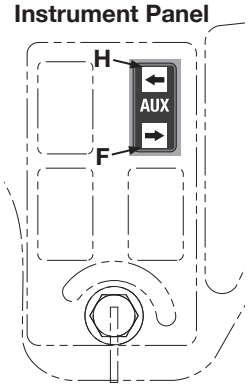
Harness Part Number 000-200-394

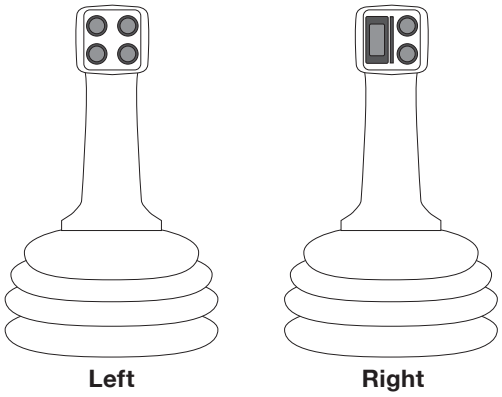
Pin	Level Best Function
E	Left (Elevation) Raise
D	Left (Elevation) Lower
C & E	Right (Slope) Raise
C & D	Right (Slope) Lower
G	Auto/Manual
C	Combo
A	Ground

Figure 2-3. John Deere E-Series Joystick Functions



Instrument Panel





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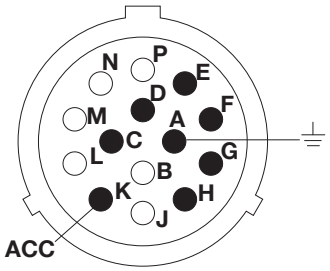
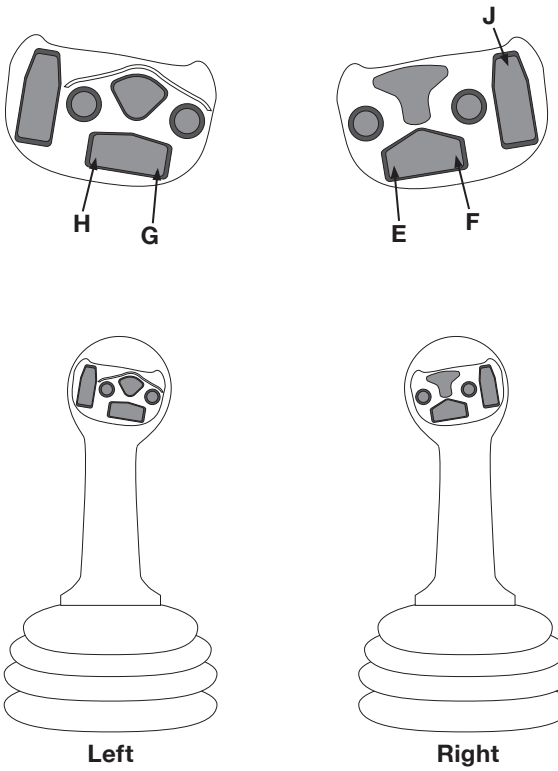


Harness Part Number 000-200-489

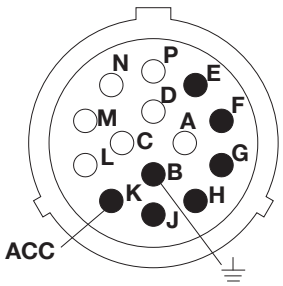
Pin	Level Best Function
E	Left (Elevation) Raise
D	Left (Elevation) Lower
C & E	Right (Slope) Raise
C & D	Right (Slope) Lower
G	Auto/Manual
C	Combo
A	Ground
K	Key Power
H	Increment
F	Decrement

Confirm power @ Pin K

Figure 2-4. John Deere G-Series Joystick Functions



Skid Steer Connection

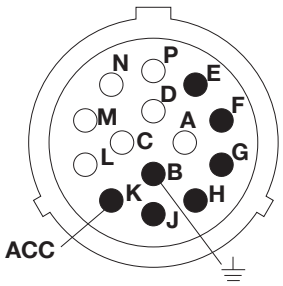


Harness Part Number 000-200-395

Pin	Level Best Function
H	Left (Elevation) Raise
G	Left (Elevation) Lower
J & H	Right (Slope) Raise
J & G	Right (Slope) Lower
E	Auto/Manual
F	Auto/Manual
J & E	Increment
J & F	Decrement
J	Toggle Switch (Combo)
K	Key Power
B	Ground

Figure 2-5. Kubota SSV65 & 75 Joystick Functions

Skid Steer Connection



Harness Part Number 000-200-395

Pin	Level Best Function
H	Left (Elevation) Raise
G	Left (Elevation) Lower
J & H	Right (Slope) Raise
J & G	Right (Slope) Lower
E	Auto/Manual
F	Auto/Manual
J & E	Increment
J & F	Decrement
J	Toggle Switch (Combo)
K	Key Power
B	Ground

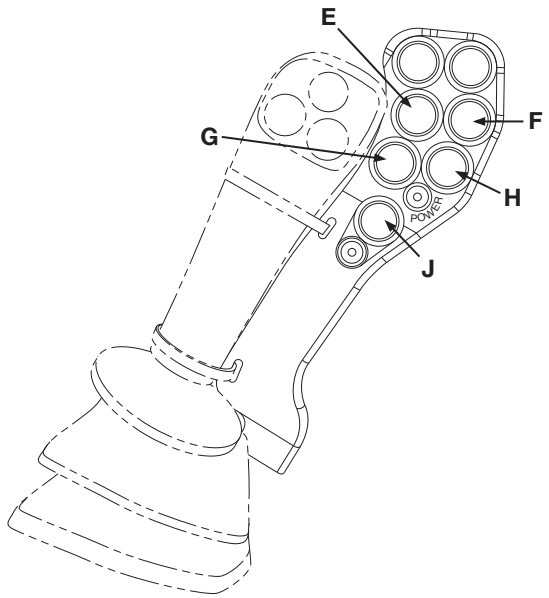
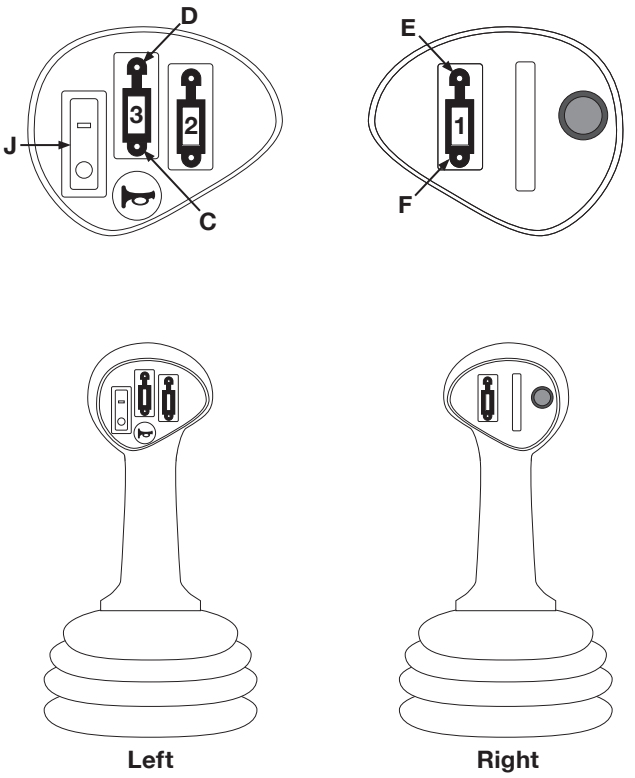


Figure 2-6. Kubota SVL 95 S6699 Multifunction Controller Kit



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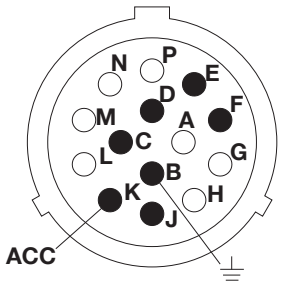
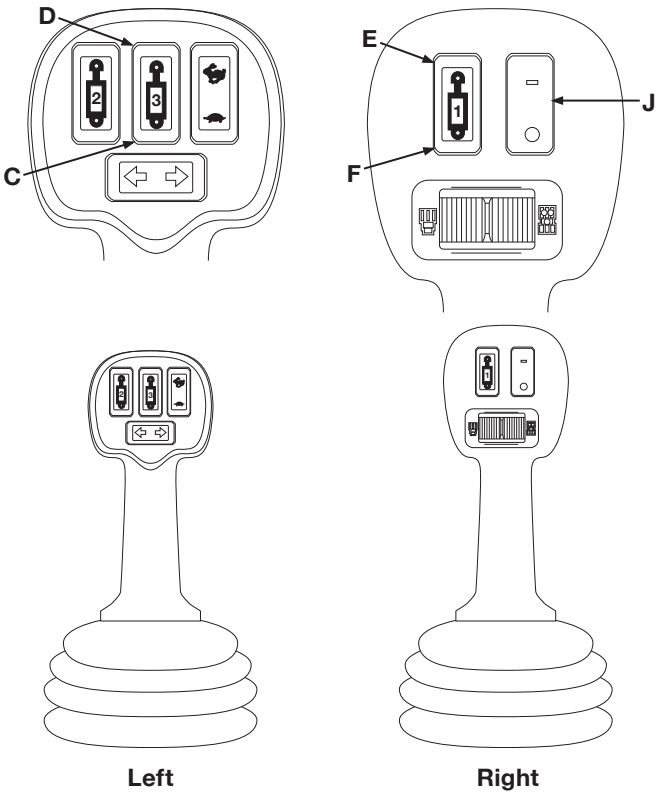


Harness Part Number 000-200-396

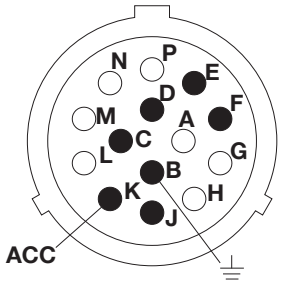
Pin	Level Best Function
D	Left (Elevation) Raise
C	Left (Elevation) Lower
J & D	Right (Slope) Raise
J & C	Right (Slope) Lower
E	Auto/Manual
F	Auto/Manual
J & E	Increment
J & F	Decrement
J	Toggle Switch (Combo)
K	Key Power
B	Ground

NOTE: Must be "Level 300" or higher Joystick Confriguration

Figure 2-7. Case Joystick Functions



Skid Steer Connection



Harness Part Number 000-200-396

Pin	Level Best Function
D	Left (Elevation) Raise
C	Left (Elevation) Lower
J & D	Right (Slope) Raise
J & C	Right (Slope) Lower
E	Auto/Manual
F	Auto/Manual
J & E	Increment
J & F	Decrement
J	Toggle Switch (Combo)
K	Key Power
B	Ground

NOTE: Must be "Level 300" or higher Joystick Confriguration

Figure 2-8. New Holland Joystick Functions

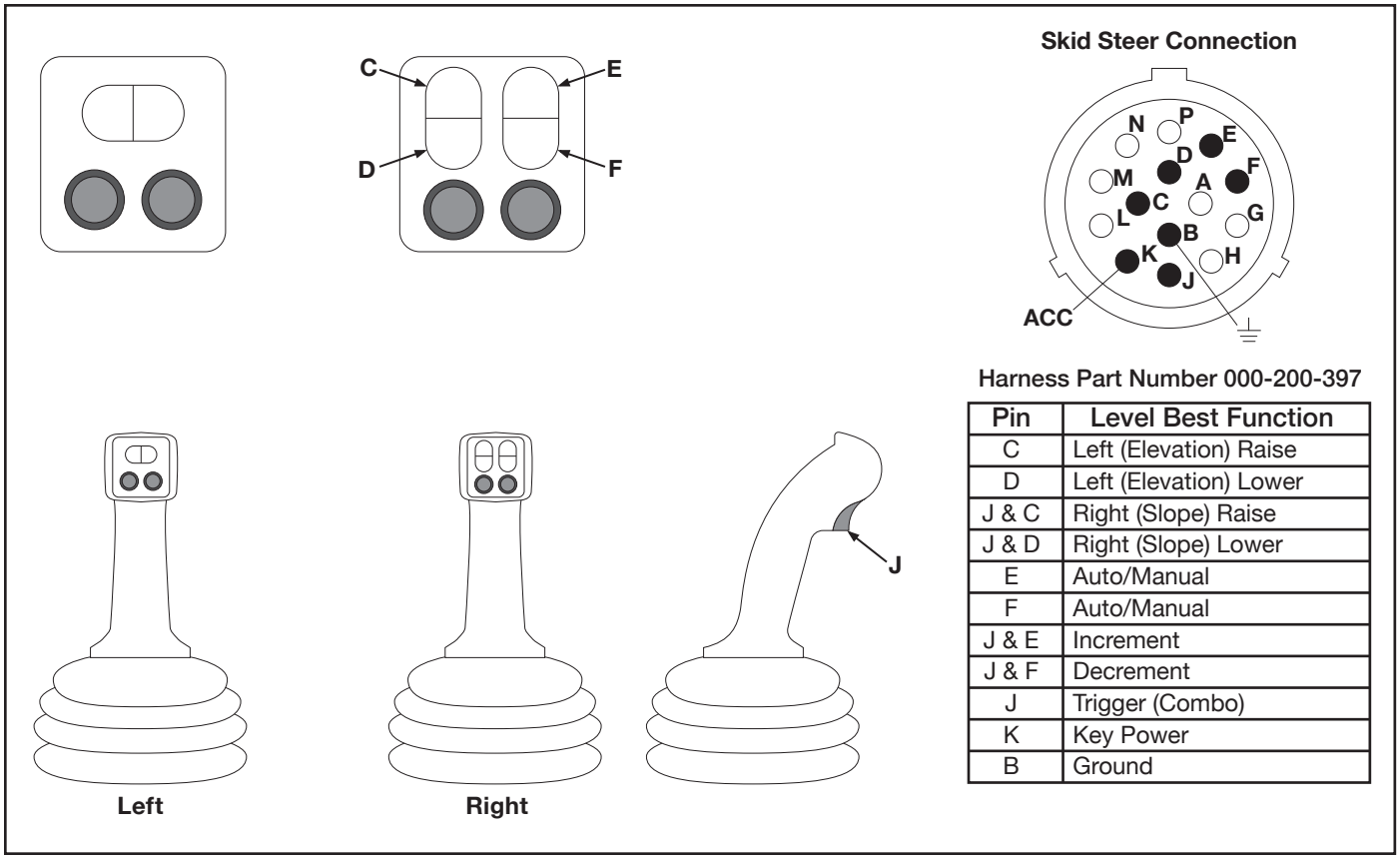


Figure 2-9. Takeuchi TL12/TL250 Joystick Functions

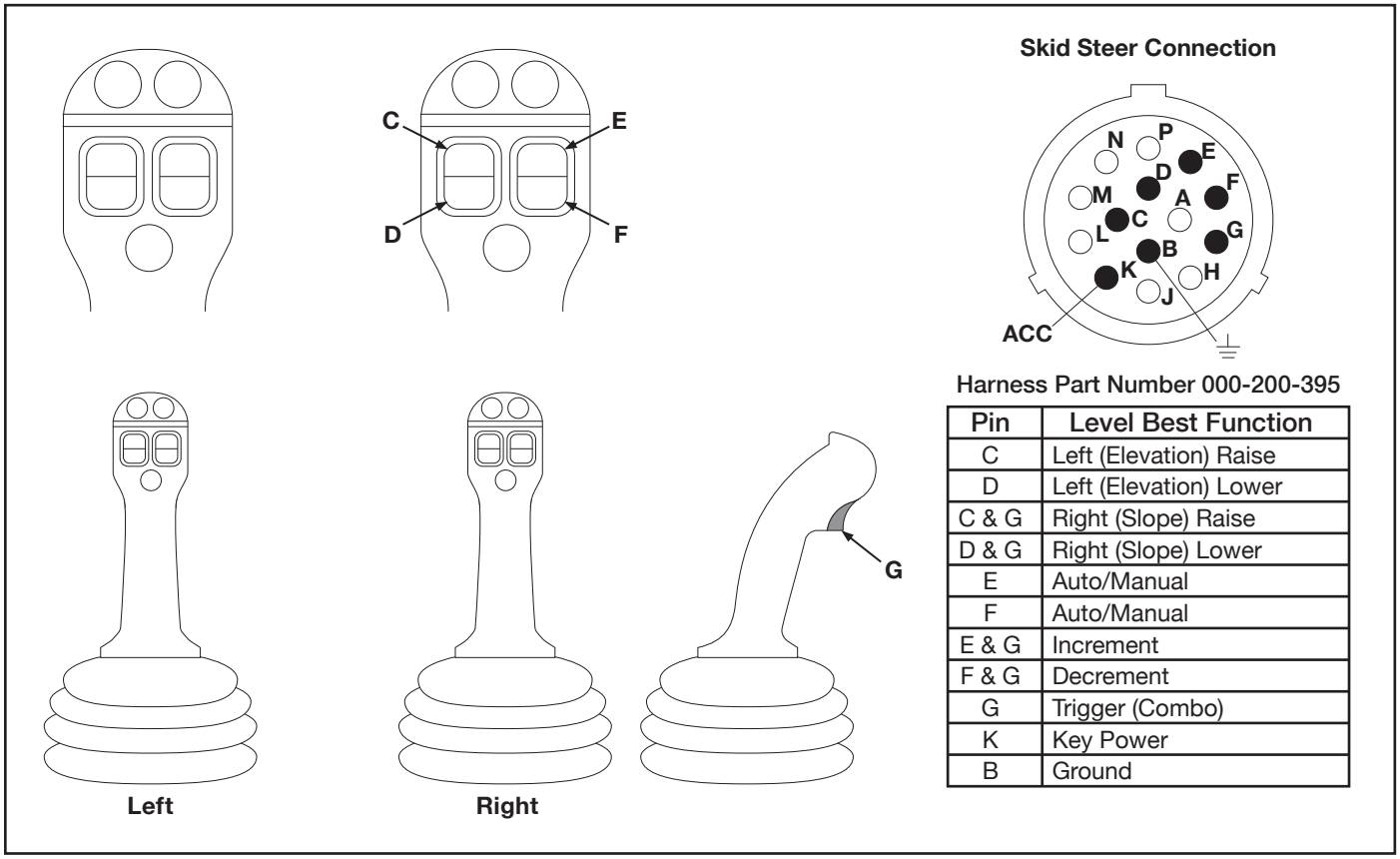
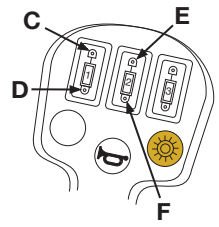
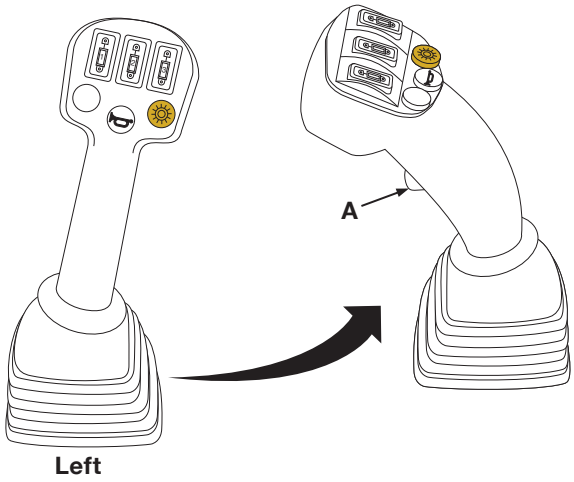
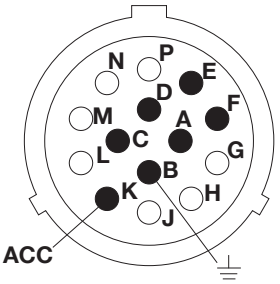


Figure 2-10. JCB/Volvo Joystick Functions





Skid Steer Connection



Harness Part Number 000-200-515

Pin	Level Best Function
C	Left (Elevation) Raise
D	Left (Elevation) Lower
C & A	Right (Slope) Raise
D & A	Right (Slope) Lower
E	Auto/Manual
F	Auto/Manual
E & A	Increment
F & A	Decrement
A	Trigger (Combo)
K	Key Power
B	Ground

NOTE: Electric Attachment Control Kit (P/N 50840097)

Figure 2-11. Mustang/Gehl Joystick Functions

NOTE: For any machine not listed, contact ATI for more information.

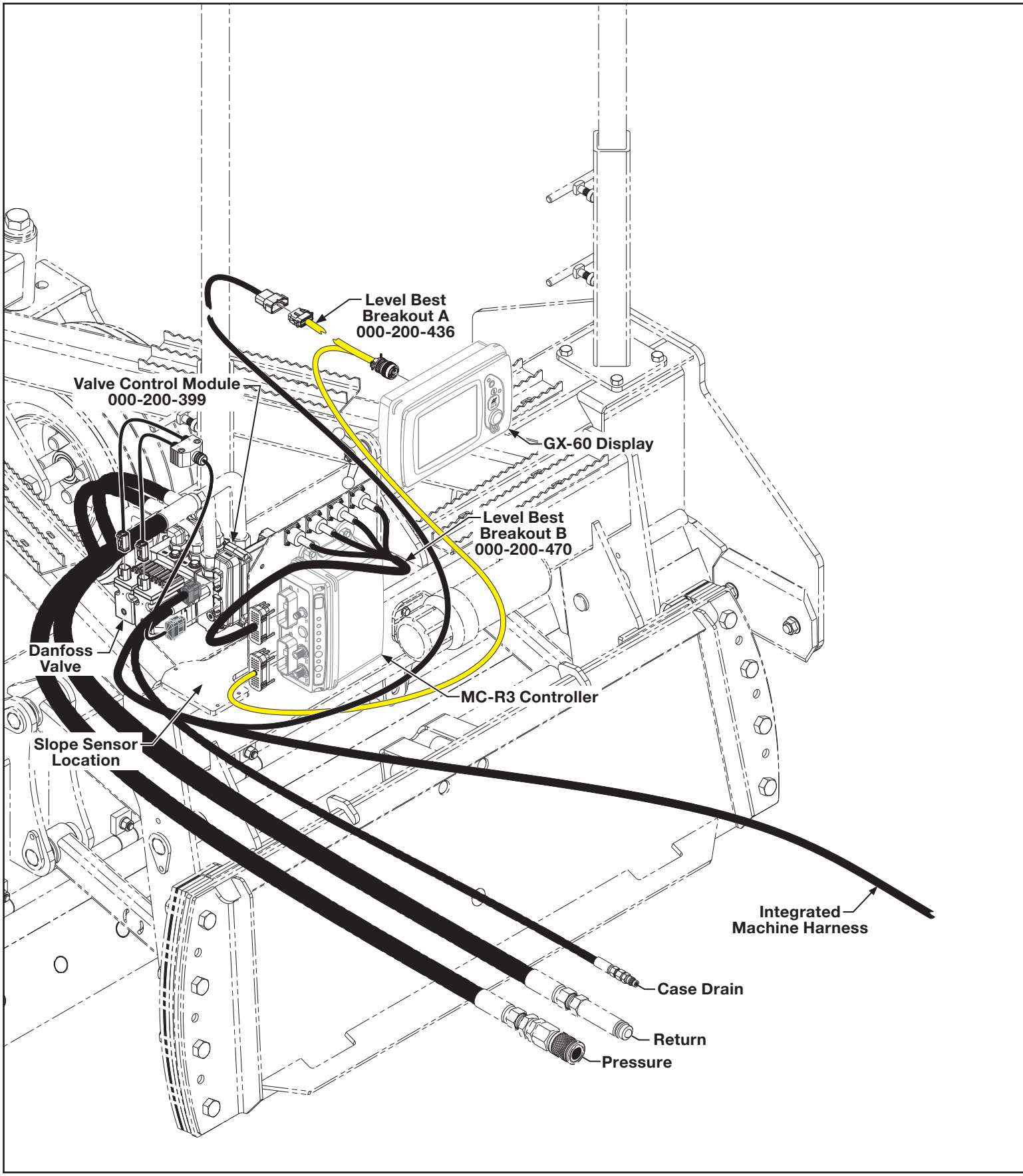


Figure 3-1. General Arrangement for Integrated Machine Harness

Topcon Configuration

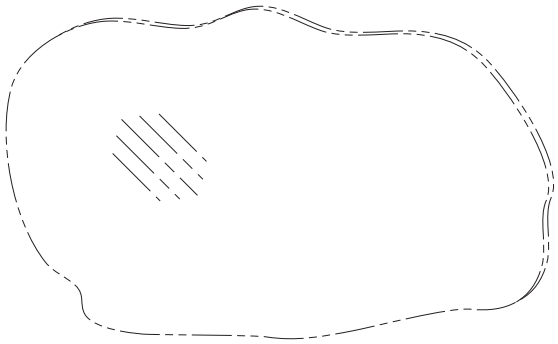
NOTE: To ensure proper communication with the Level Best hydraulic control system, the Topcon Control Panel must be configured by an authorized Topcon representative.

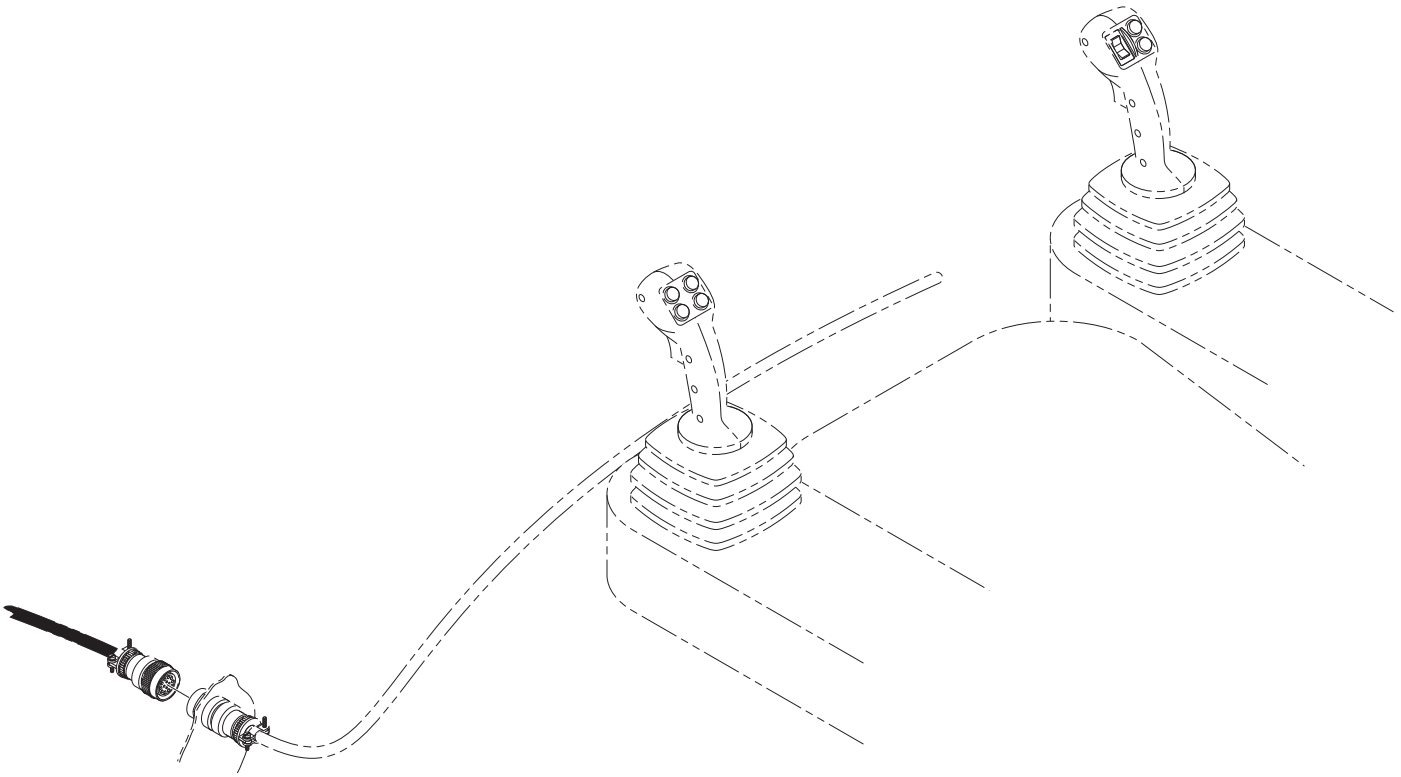
To allow the Topcon Control Panel to properly address the Level Best hydraulic control valve, the following must be set:

The "Valve Input" must be set to *CNH CAN*.

The "Input Device" must be set to *CAN Input*.

NOTE: If required, run a wire from the loader's back-up alarm to the 'Back-up Alarm' plug on the Breakout A harness. This needs to be a simple 12 V signal.





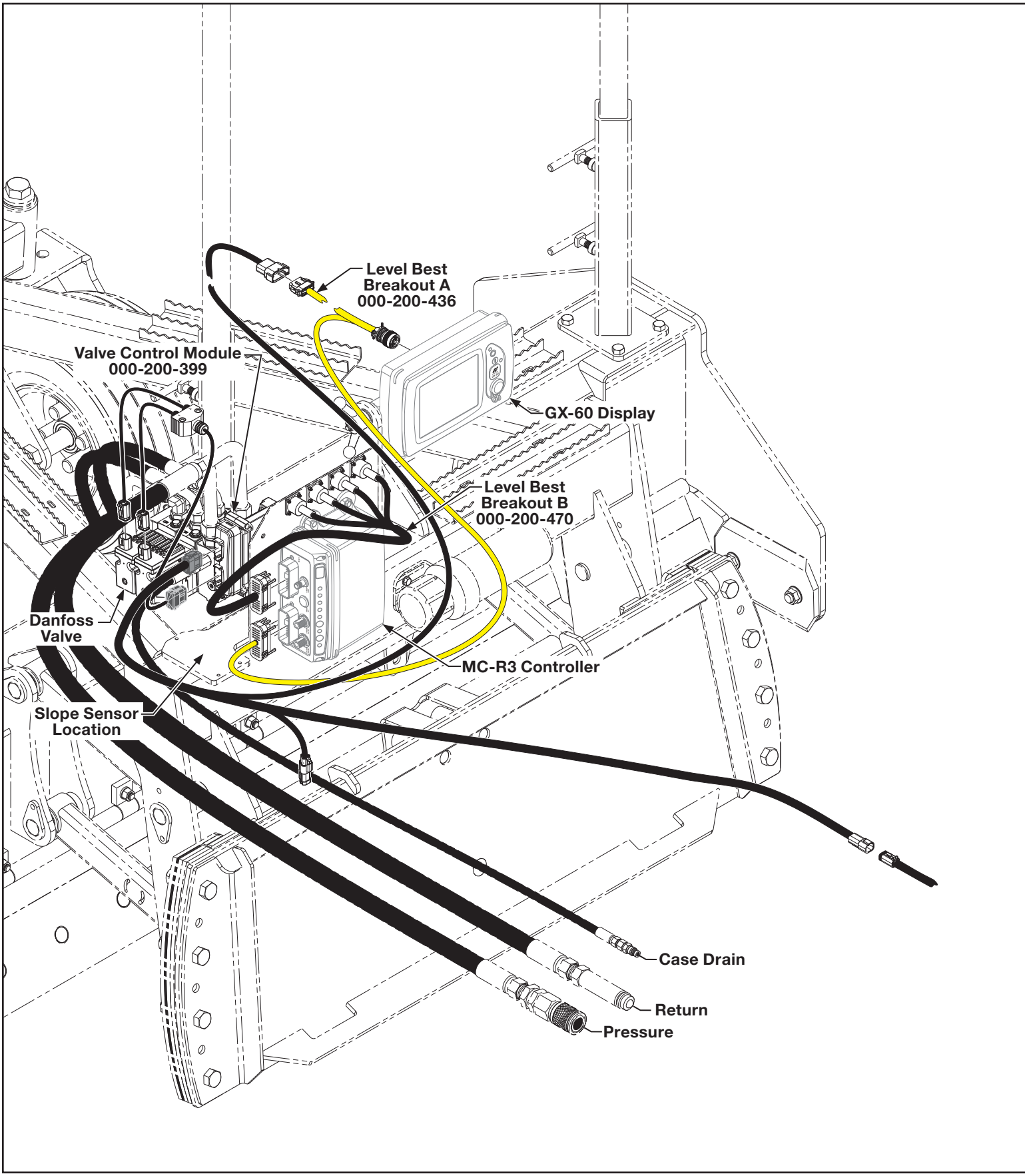


Figure 3-2. General Arrangement Universal Joystick

Topcon Configuration

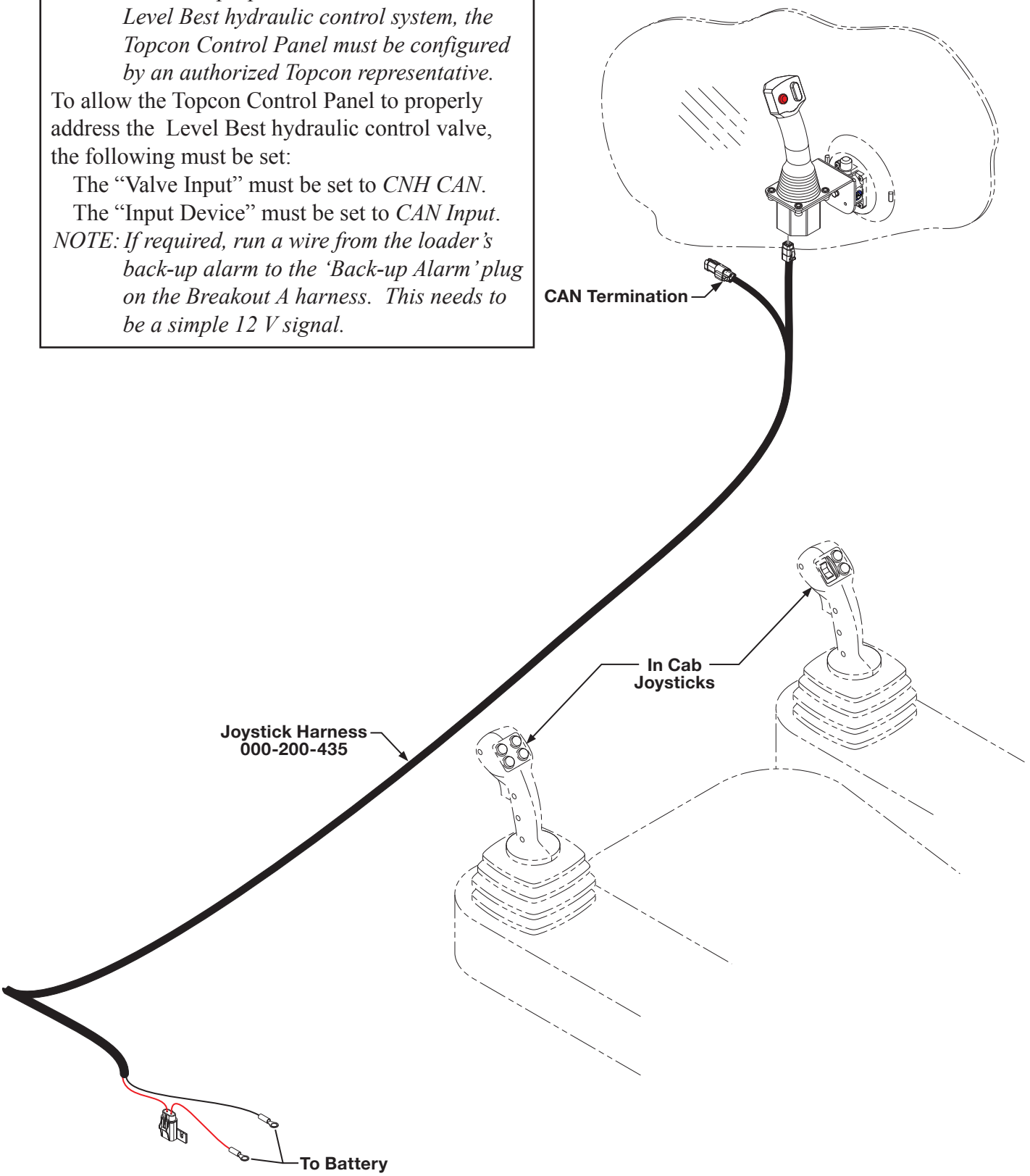
NOTE: To ensure proper communication with the Level Best hydraulic control system, the Topcon Control Panel must be configured by an authorized Topcon representative.

To allow the Topcon Control Panel to properly address the Level Best hydraulic control valve, the following must be set:

The "Valve Input" must be set to *CNH CAN*.

The "Input Device" must be set to *CAN Input*.

NOTE: If required, run a wire from the loader's back-up alarm to the 'Back-up Alarm' plug on the Breakout A harness. This needs to be a simple 12 V signal.



Connection of the Module Controller

The Module Controller provides the electronic interface between the Topcon control system in the cab and the hydraulic valve.

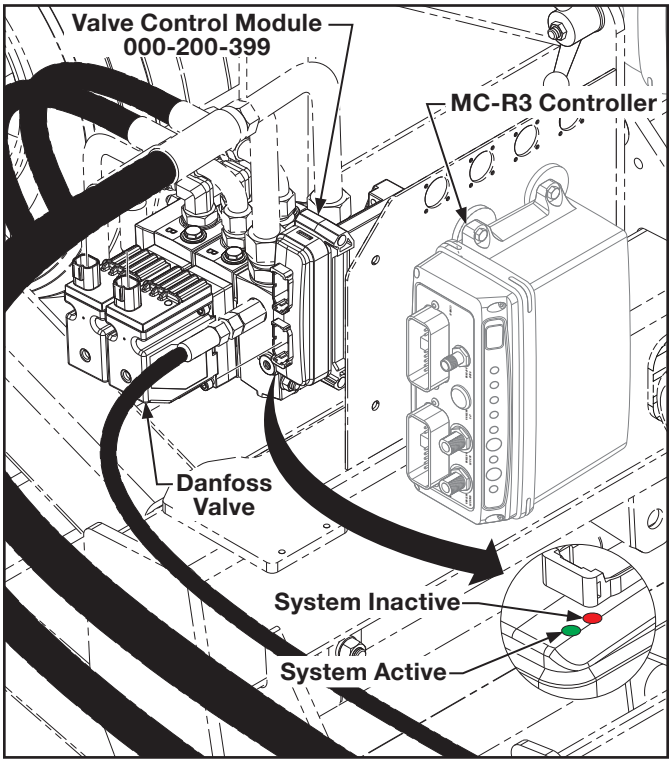


Figure 3-3. Module Controller

Connecting the two components is the Valve Module Cable (see **Figure 3-4**). Each connector to the valve is keyed to prevent insertion into the wrong socket. In the same way, the Module Controller end may only be inserted into the correct socket.

NOTE: Never force a plug into a socket. Plugs are keyed to prevent incorrect insertion.

Two LEDs indicate the operating statue of the Module Controller.

The green LED indicates that power is applied and the system is operating normally.

The red LED indicates an error in the communications system. The wire connections should be checked and, if this does not solve the issue, contact your local Topcon service department.

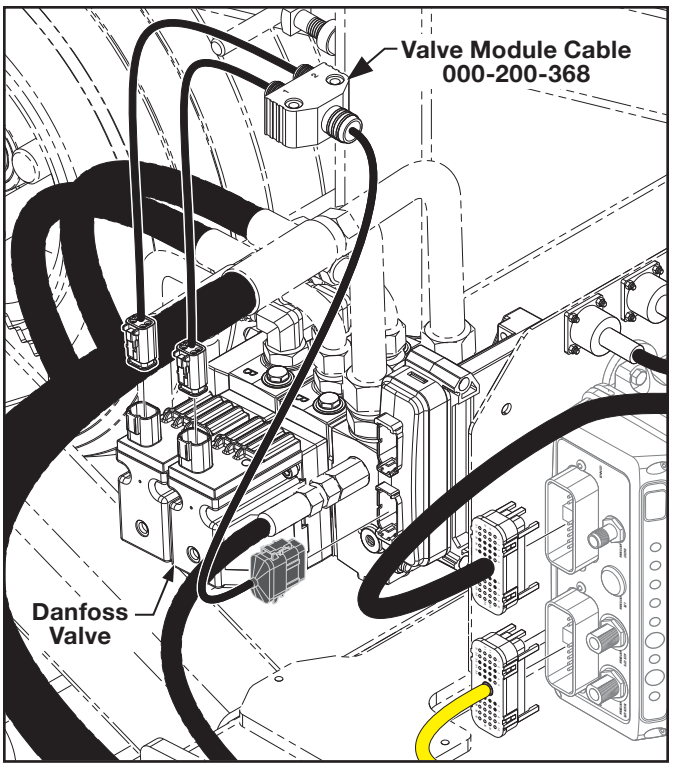


Figure 3-4. Valve Module Cable

The Module Controller also connects to the joystick cable (see **Figure 3-5**) note that this cable includes a connector to allow the grading box to be removed from the skid steer without fully removing the cable from the machine.

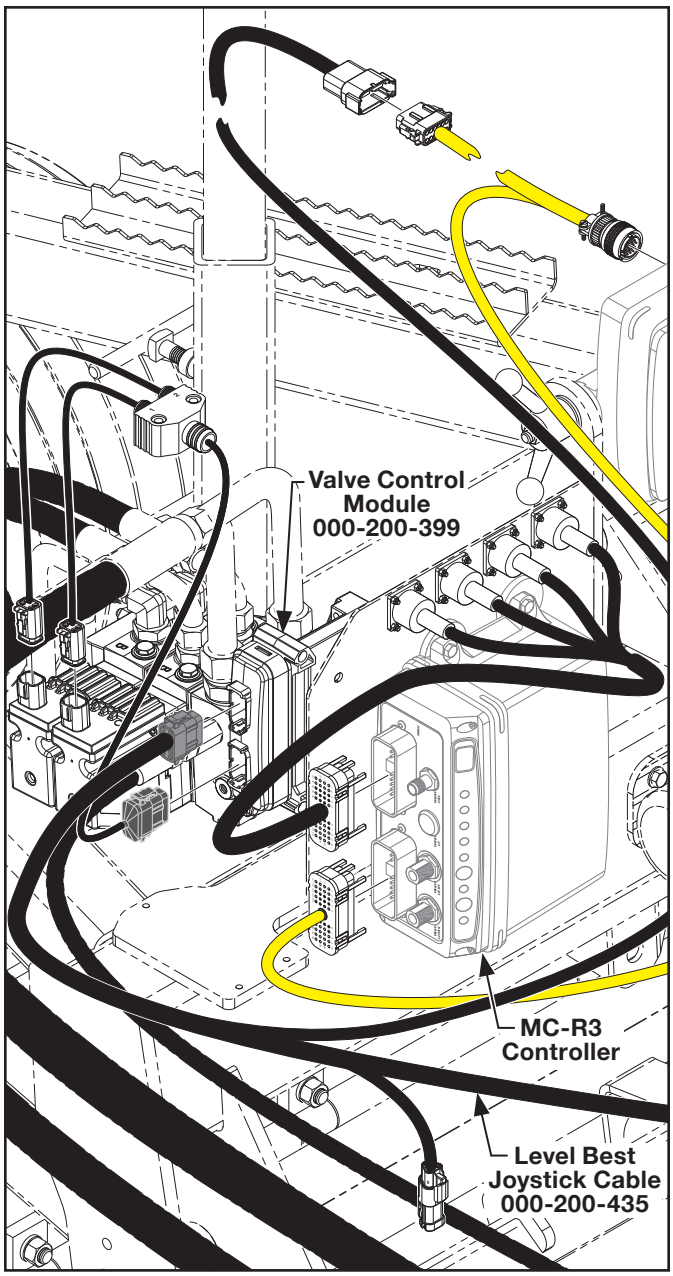


Figure 3-5. Level Best Joystick Harness

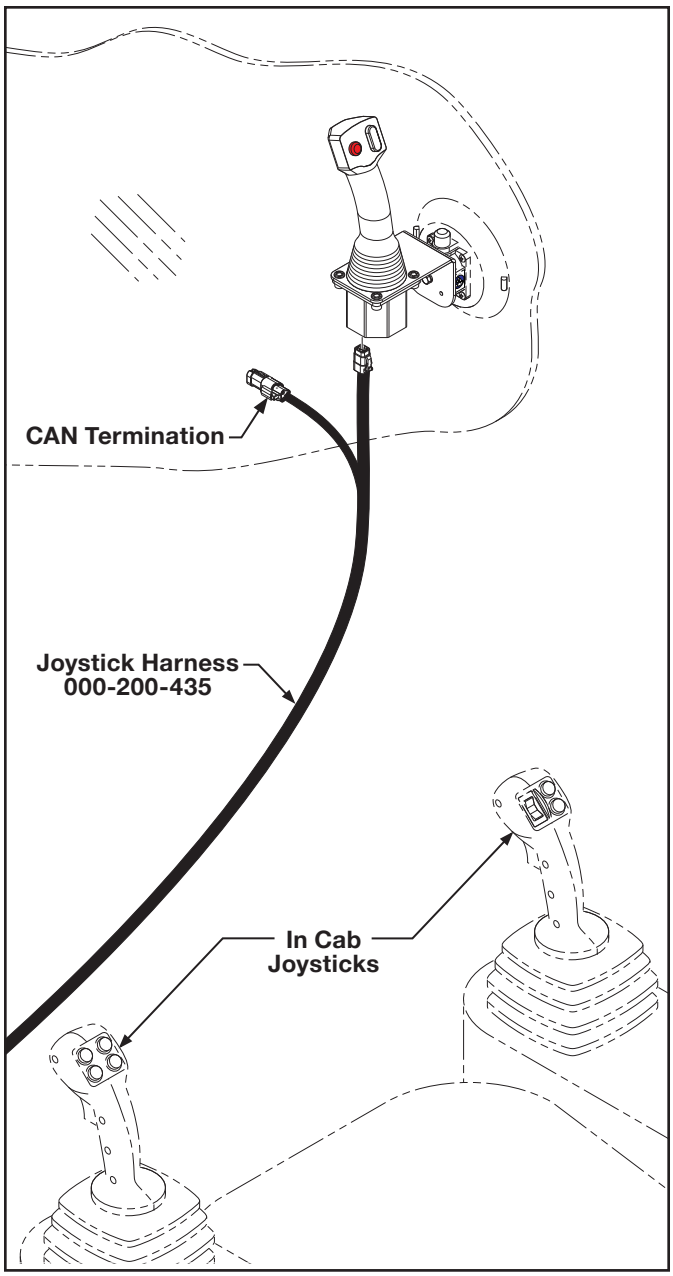


Figure 3-6. Joystick with Cable

If the optional joystick is to be installed (see **Figure 3-6**), plug the joystick cable. Install the vacuum cup as described in Vacuum Cup on **page 7.5**.

Auxiliary joystick - A standalone joystick (see **Figure 3-2**) provides selection of automatic and manual control. When in manual control, the grading box can be raised and tilted as desired (see **Figure 1-2. Optional Joystick Functions on page 1.1**). A suction cup allows installation of the joystick on a side window.

(for future use)

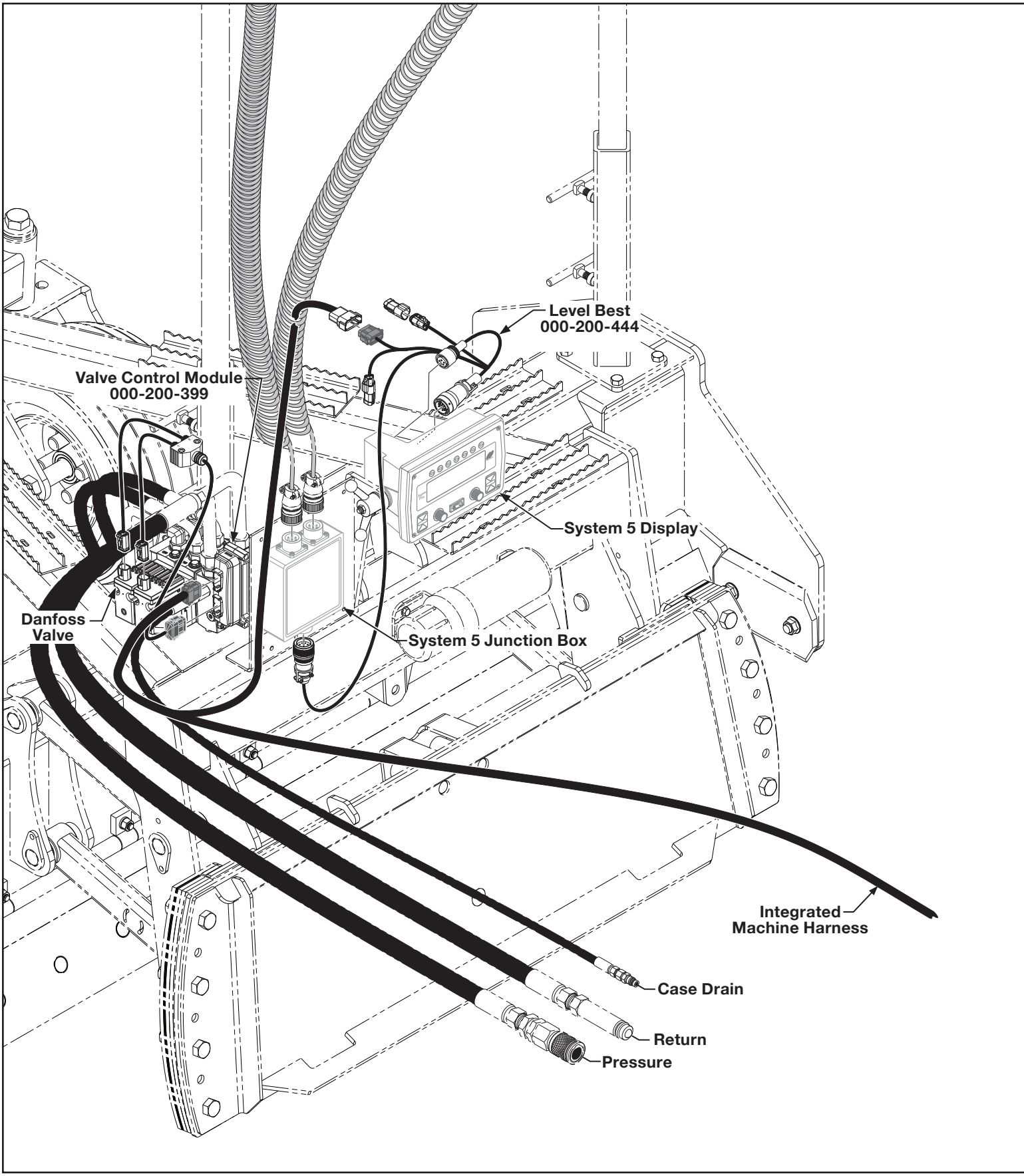


Figure 4-1. General Arrangement for Integrated Machine Harness

Topcon Configuration

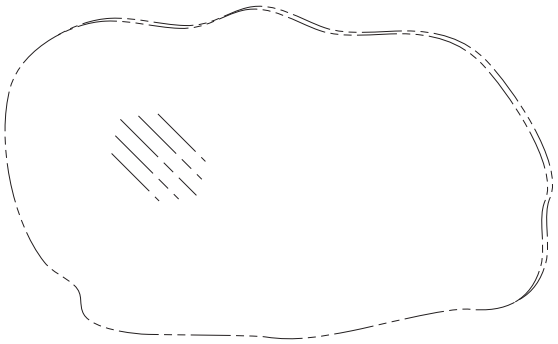
NOTE: To ensure proper communication with the Level Best hydraulic control system, the Topcon Control Panel must be configured by an authorized Topcon representative.

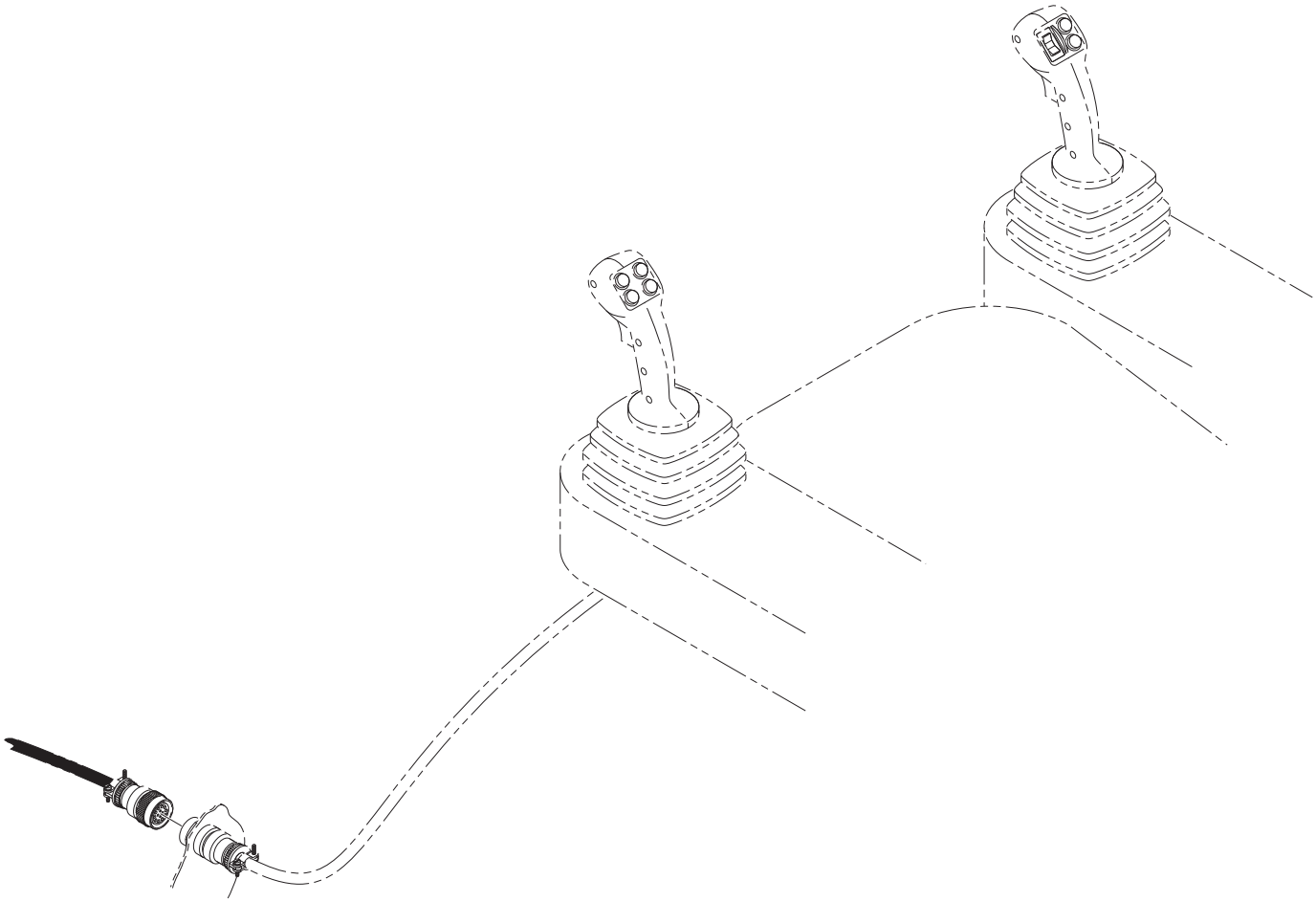
To allow the Topcon Control Panel to properly address the Level Best hydraulic control valve, the following must be set:

The "Valve Input" must be set to *CNH CAN*.

The "Input Device" must be set to *CAN Input*.

NOTE: If required, run a wire from the loader's back-up alarm to the 'Back-up Alarm' plug on the Breakout A harness. This needs to be a simple 12 V signal.





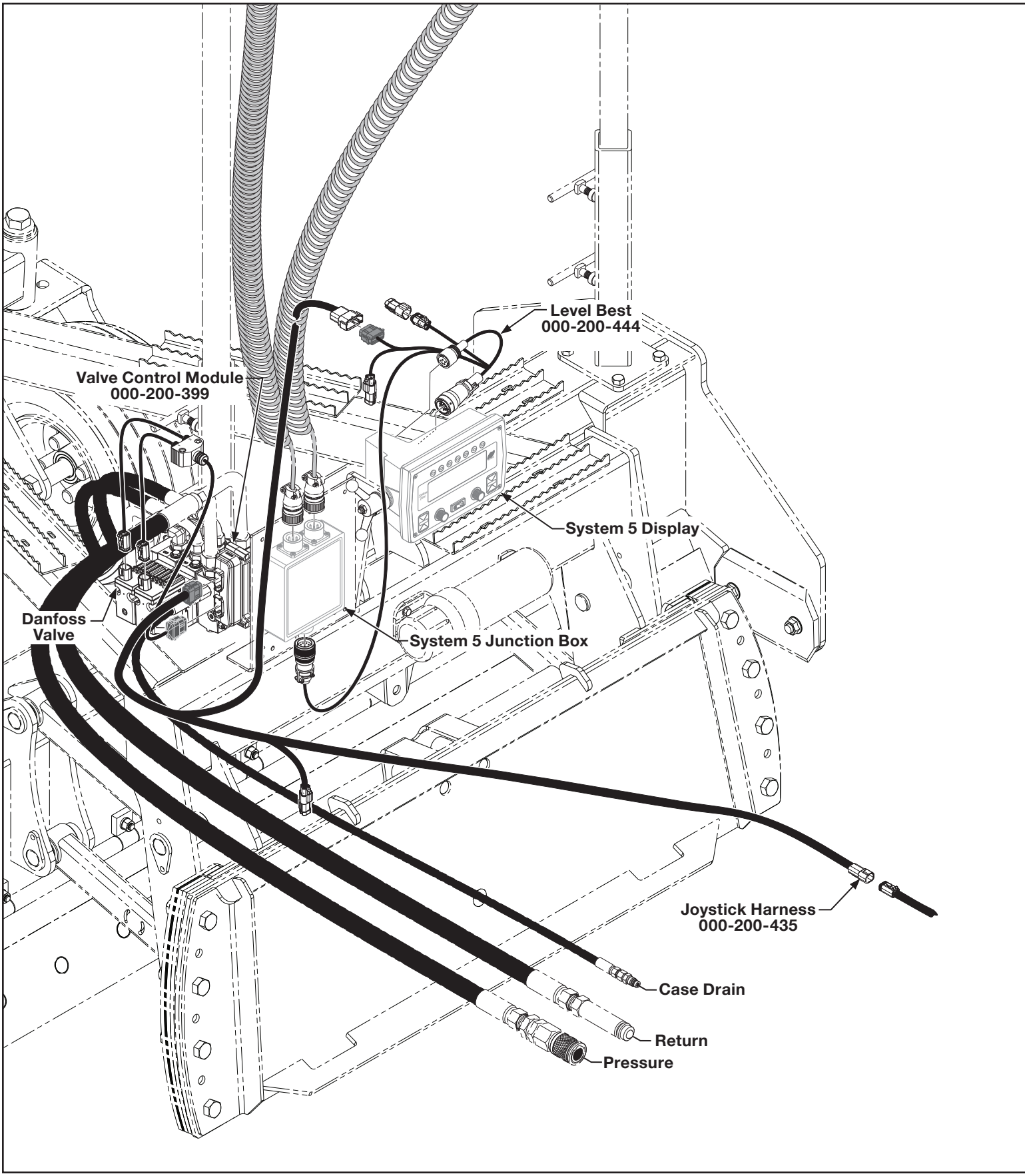


Figure 4-2. General Arrangement Universal Joystick

Topcon Configuration

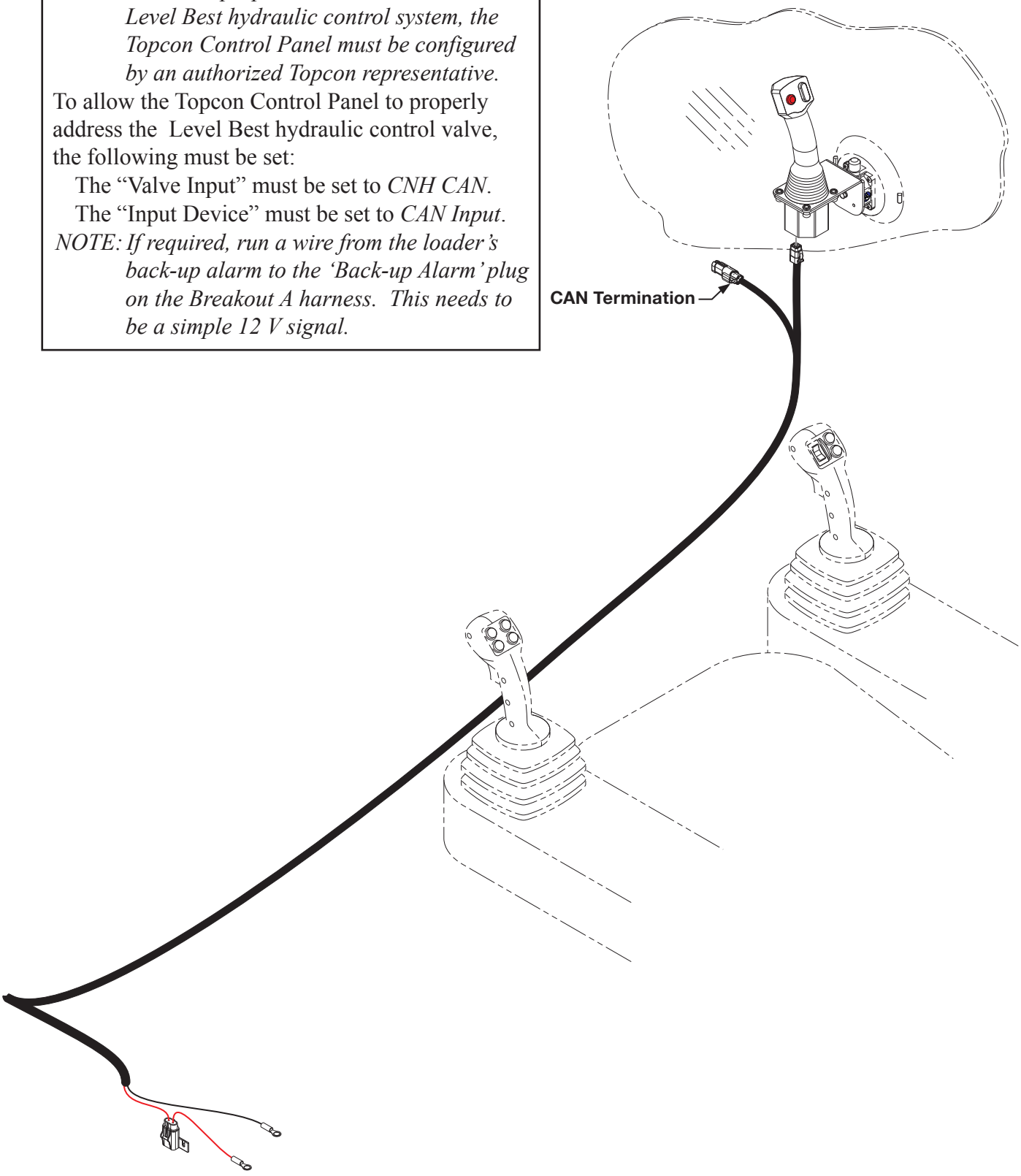
NOTE: To ensure proper communication with the Level Best hydraulic control system, the Topcon Control Panel must be configured by an authorized Topcon representative.

To allow the Topcon Control Panel to properly address the Level Best hydraulic control valve, the following must be set:

The "Valve Input" must be set to *CNH CAN*.

The "Input Device" must be set to *CAN Input*.

NOTE: If required, run a wire from the loader's back-up alarm to the 'Back-up Alarm' plug on the Breakout A harness. This needs to be a simple 12 V signal.



Connection of the Module Controller

The Module Controller provides the electronic interface between the Topcon control system in the cab and the hydraulic valve.

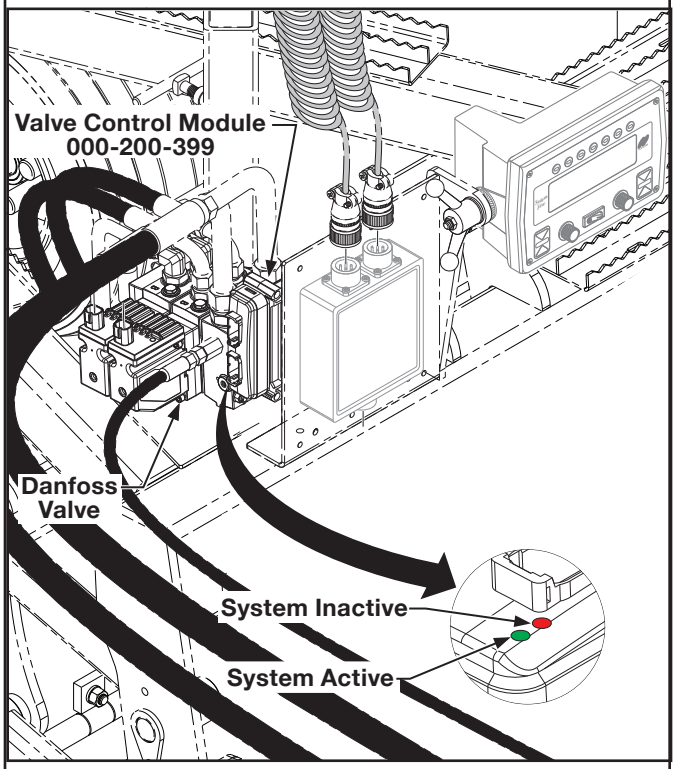


Figure 4-3. Module Controller

Connecting the two components is the Valve Module Cable (see **Figure 4-4**). Each connector to the valve is keyed to prevent insertion into the wrong socket. In the same way, the Module Controller end may only be inserted into the correct socket.

NOTE: Never force a plug into a socket. Plugs are keyed to prevent incorrect insertion.

Two LEDs indicate the operating statue of the Module Controller.

The green LED indicates that power is applied and the system is operating normally.

The red LED indicates an error in the communications system. The wire connections should be checked and, if this does not solve the issue, contact your local Topcon service department.

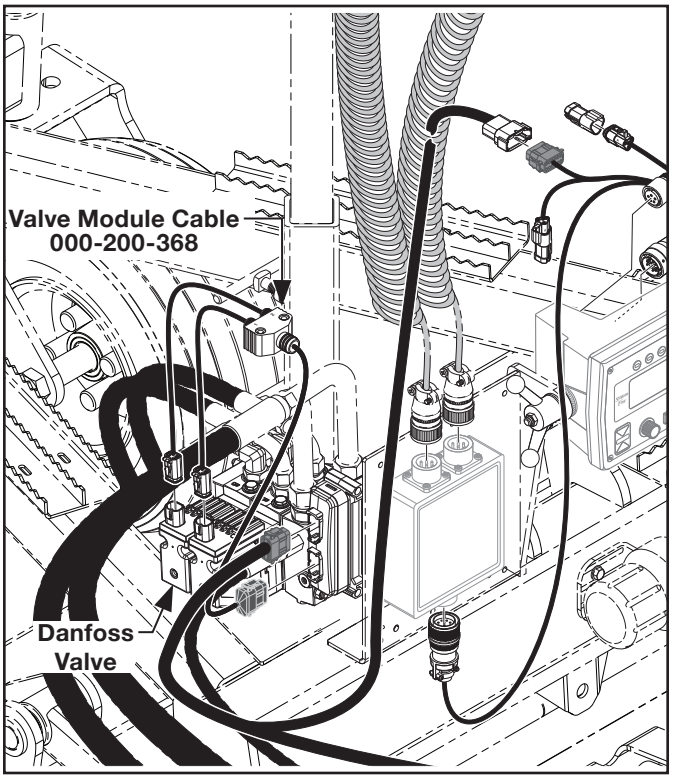


Figure 4-4. Valve Module Cable

The Module Controller also connects to the joystick cable (see **Figure 4-5**) note that this cable includes a connector to allow the grading box to be removed from the skid steer without fully removing the cable from the machine.

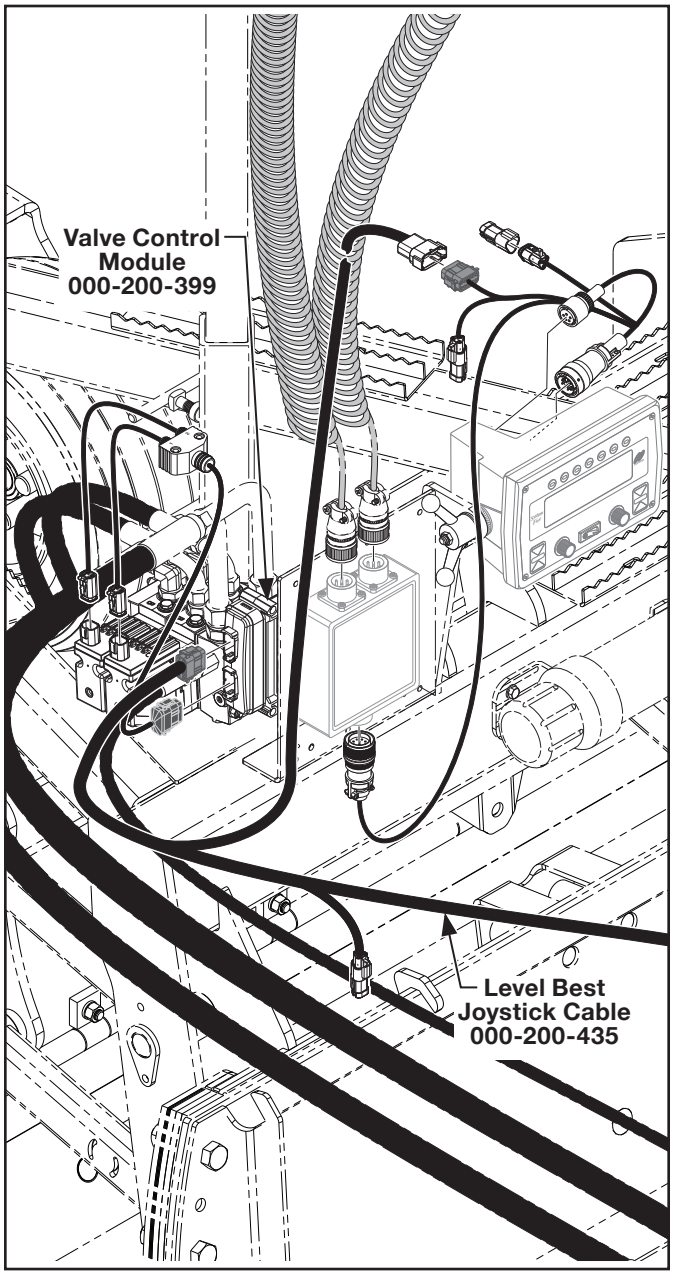


Figure 4-5. Level Best Joystick Harness

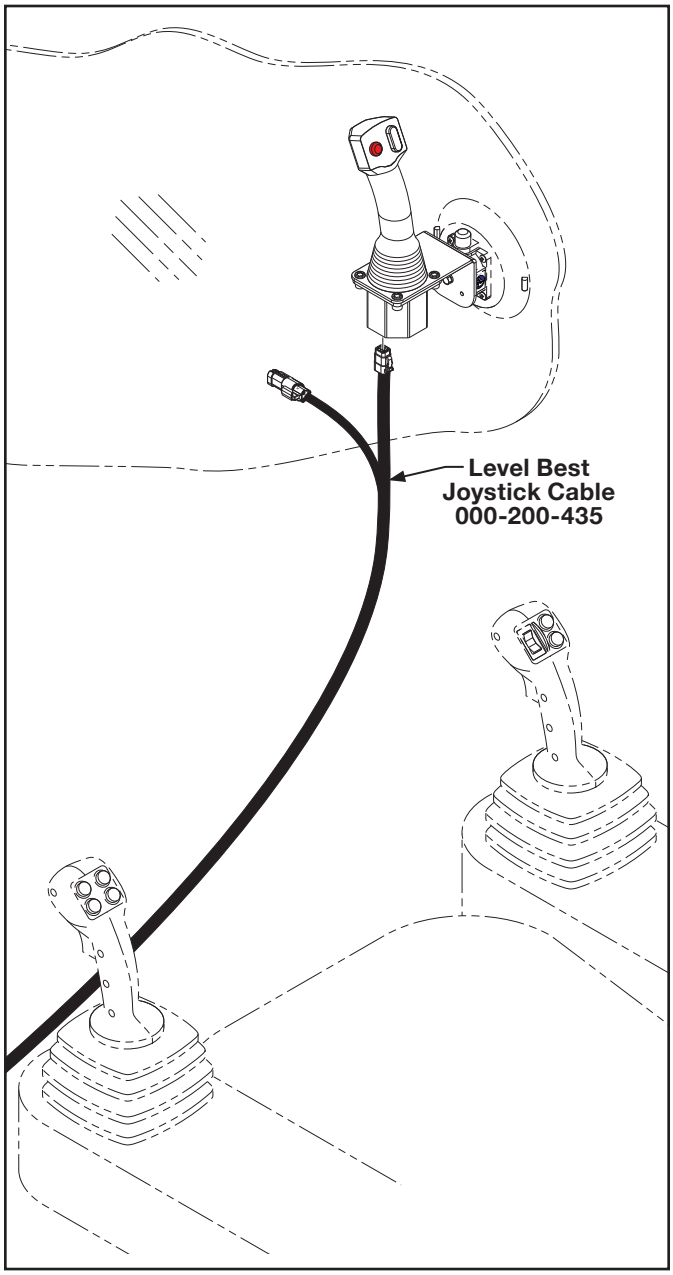


Figure 4-6. Joystick with Cable

If the optional joystick is to be installed (see **Figure 4-6**), plug the joystick cable. Install the vacuum cup as described on **page 7.5**.

Auxiliary joystick - A standalone joystick (see **Figure 4-2**) provides selection of automatic and manual control. When in manual control, the grading box can be raised and tilted as desired (see **Figure 1-2. Optional Joystick Functions on page 1.1**). A suction cup allows installation of the joystick on a side window.

(for future use)

TRIMBLE GCS900

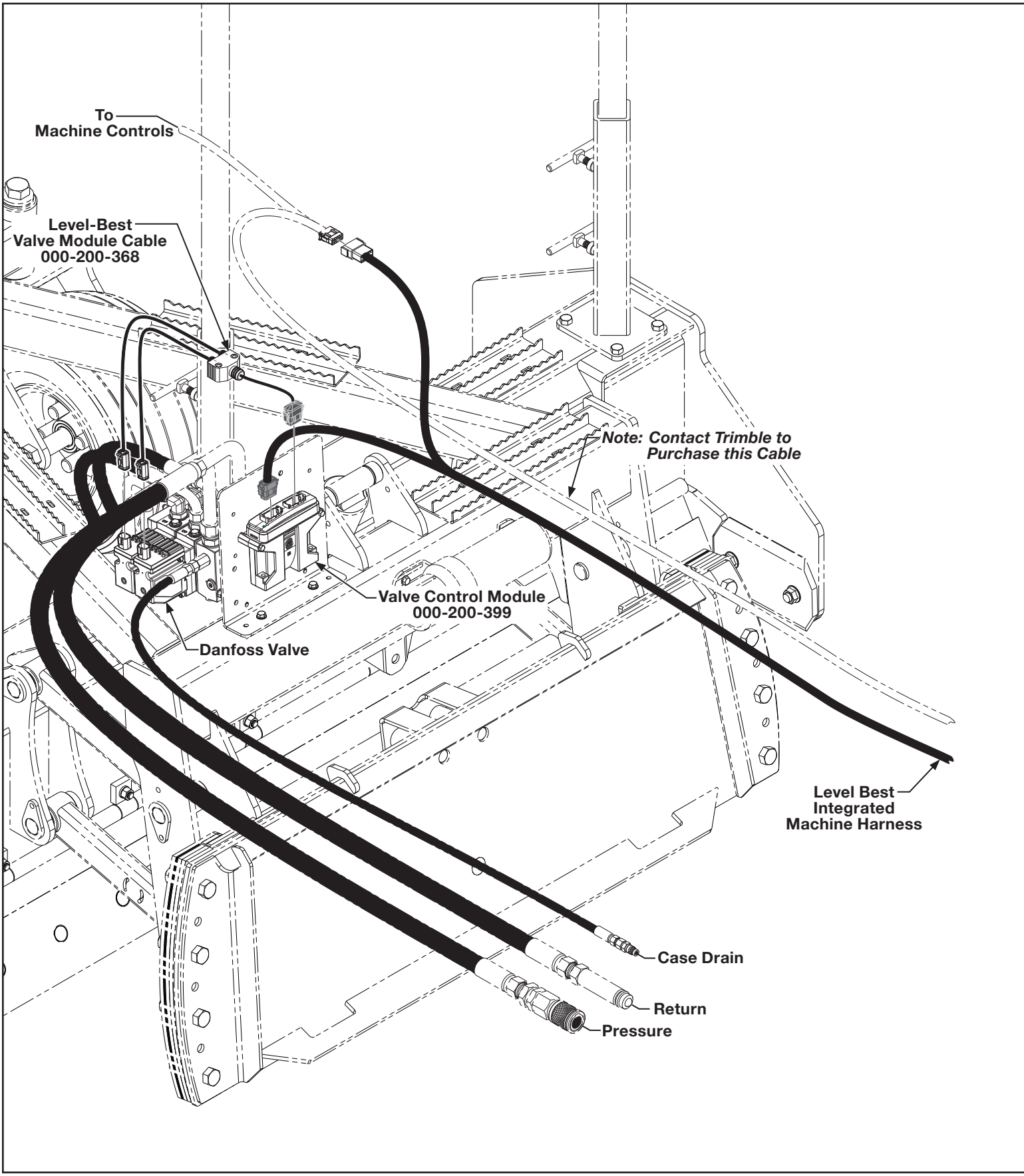
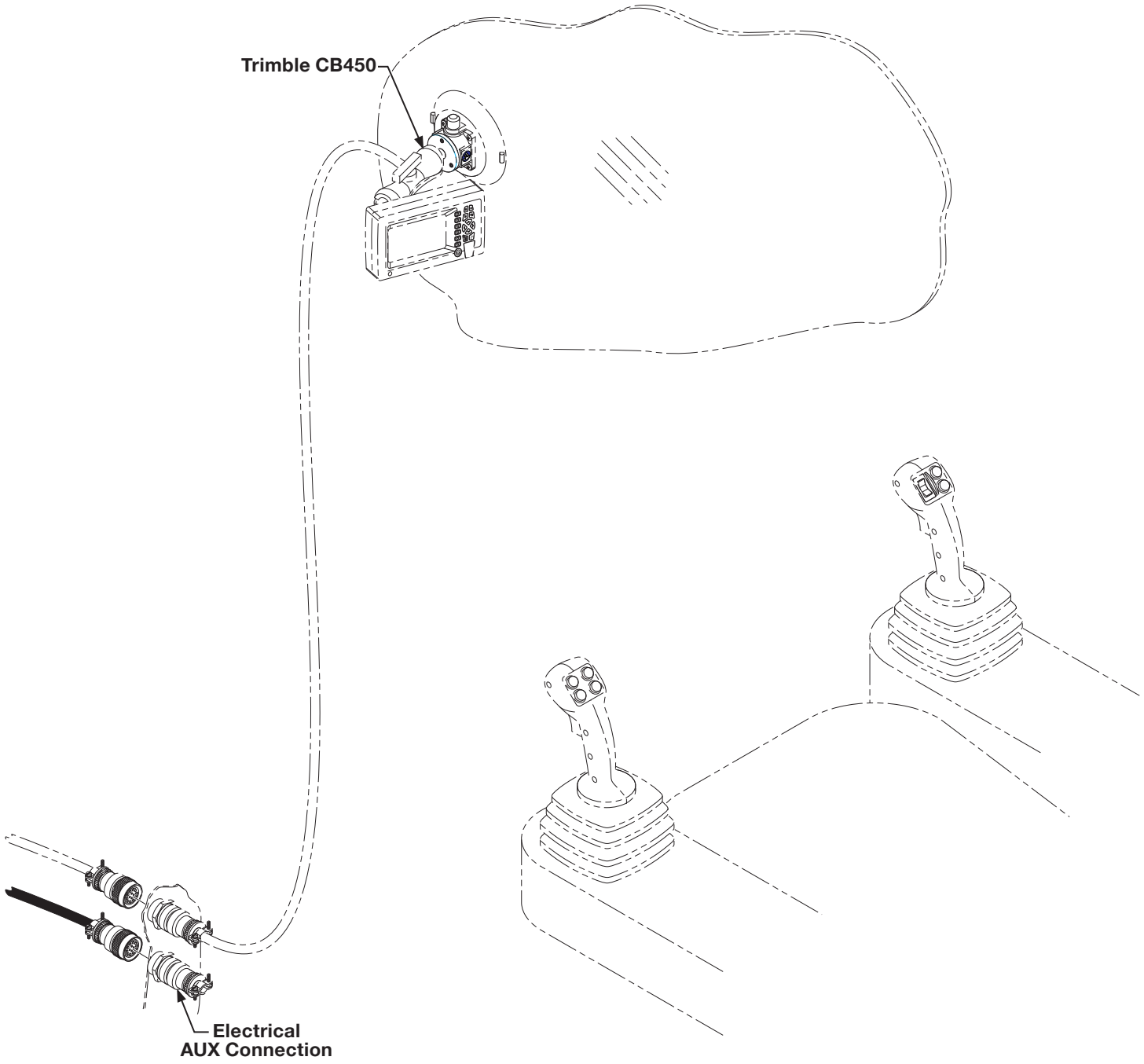


Figure 5-1. General Arrangement for Integrated Machine Harness


Trimble CB450
Electrical
AUX Connection

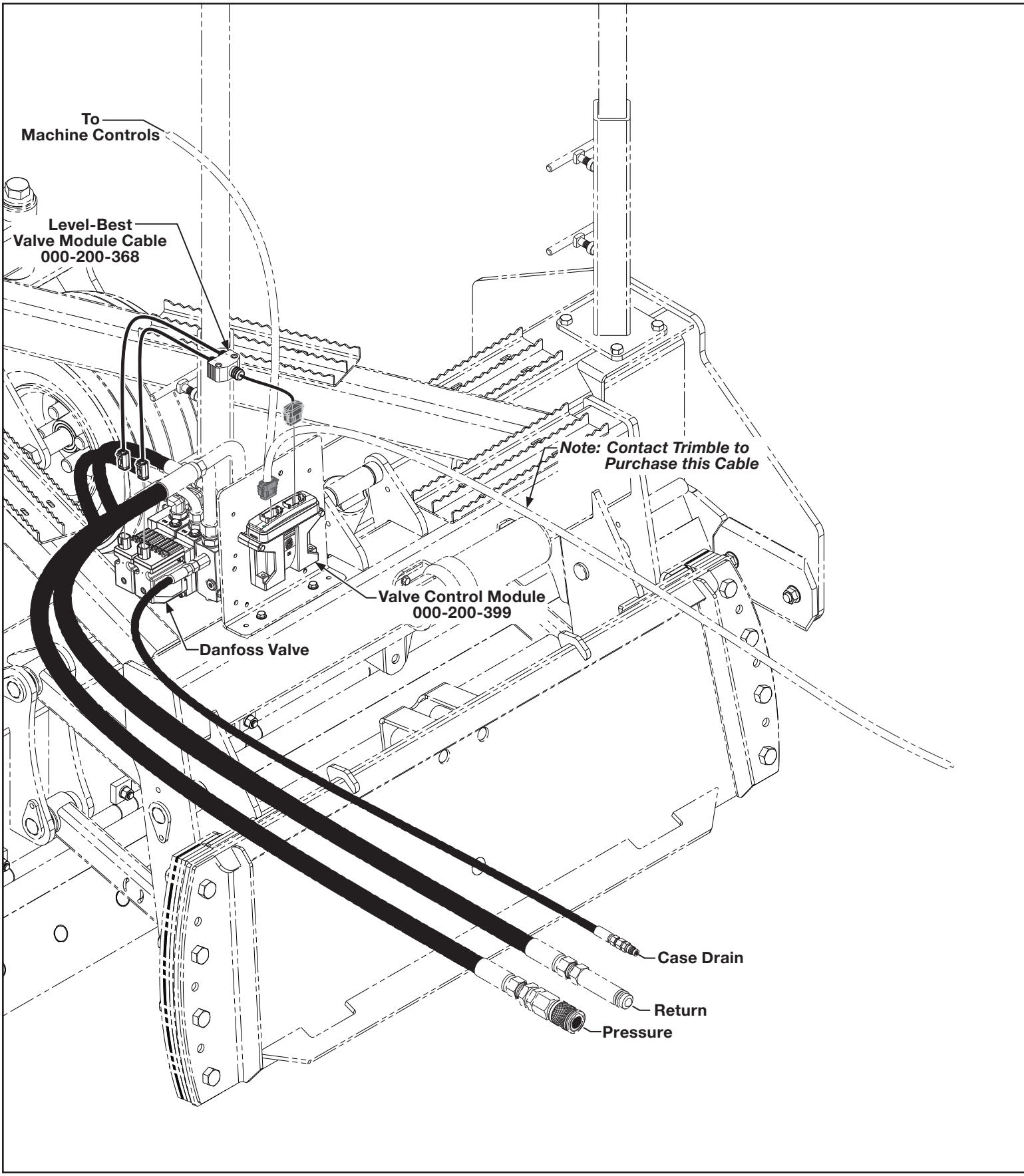
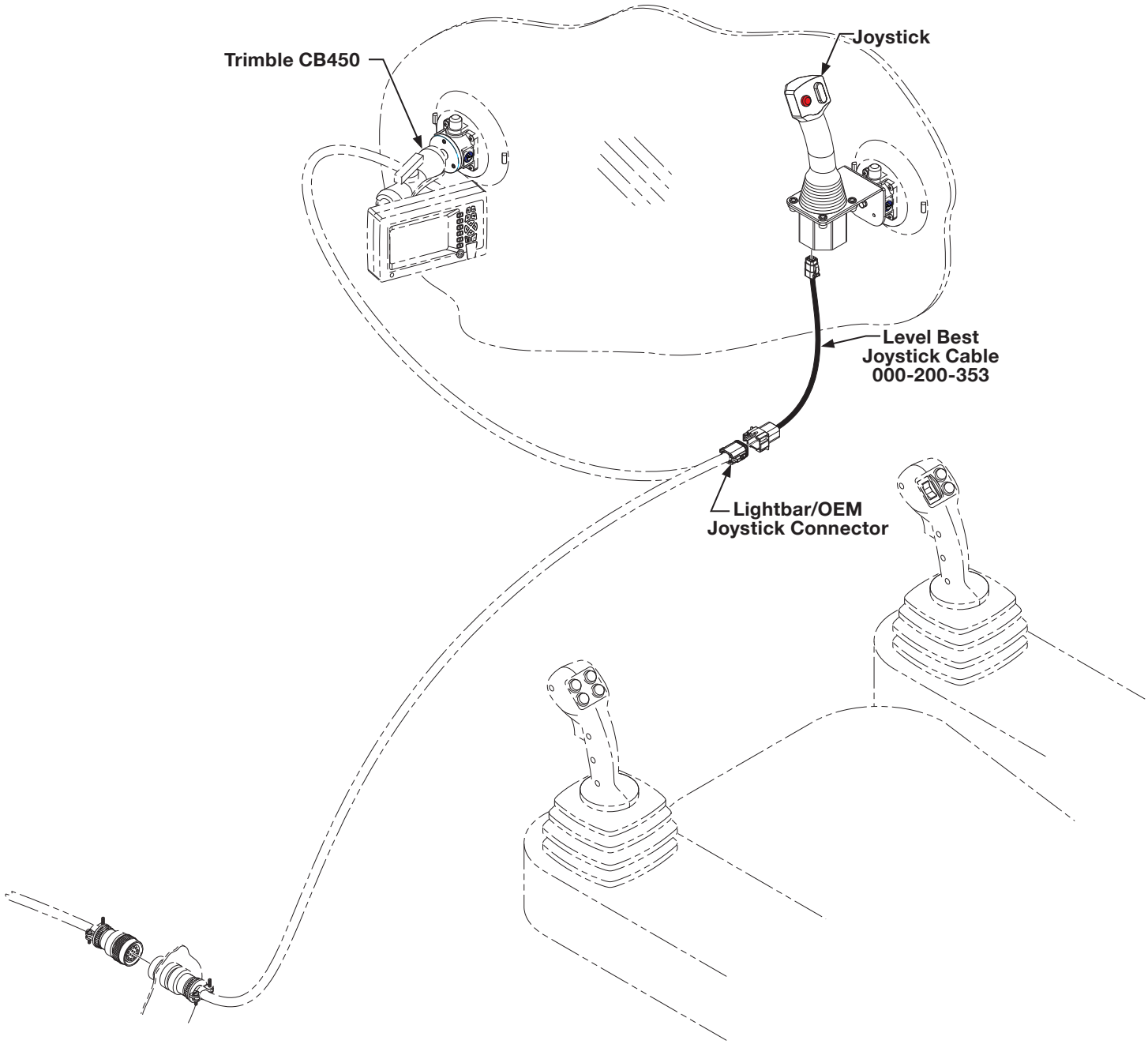


Figure 5-2. General Arrangement Trimble GCS900


Trimble CB450
Joystick
Level Best
Joystick Cable
000-200-353
Lightbar/OEM
Joystick Connector

Connection of the Module Controller

The Module Controller provides the electronic interface between the Trimble control system in the cab and the hydraulic valve.

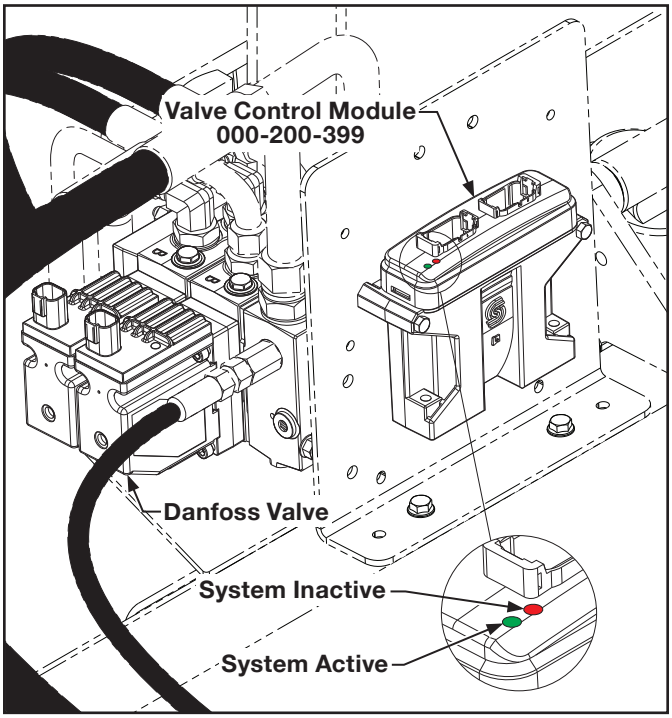


Figure 5-3. Module Controller

Connecting the two components is the Valve Module Cable (see **Figure 5-4**). Each connector to the valve is keyed to prevent insertion into the wrong socket. In the same way, the Module Controller end may only be inserted into the correct socket.

NOTE: Never force a plug into a socket. Plugs are keyed to prevent incorrect insertion.

Two LEDs indicate the operating status of the Module Controller.

The green LED indicates that power is applied and the system is operating normally.

The red LED indicates an error in the communications system. The wire connections should be checked and, if this does not solve the issue, contact your local Trimble service department.

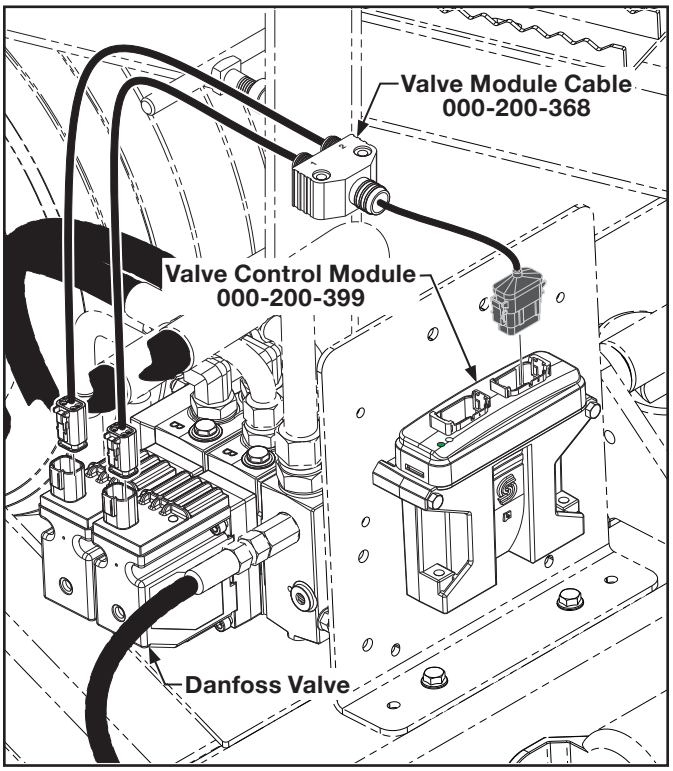


Figure 5-4. Valve Module Cable

The Module Controller also connects to the machine controls (see **Figure 5-5**) note that this cable includes a connector to allow the grading box to be removed from the skid steer without fully removing the cable.

This cable must be purchased from Trimble.

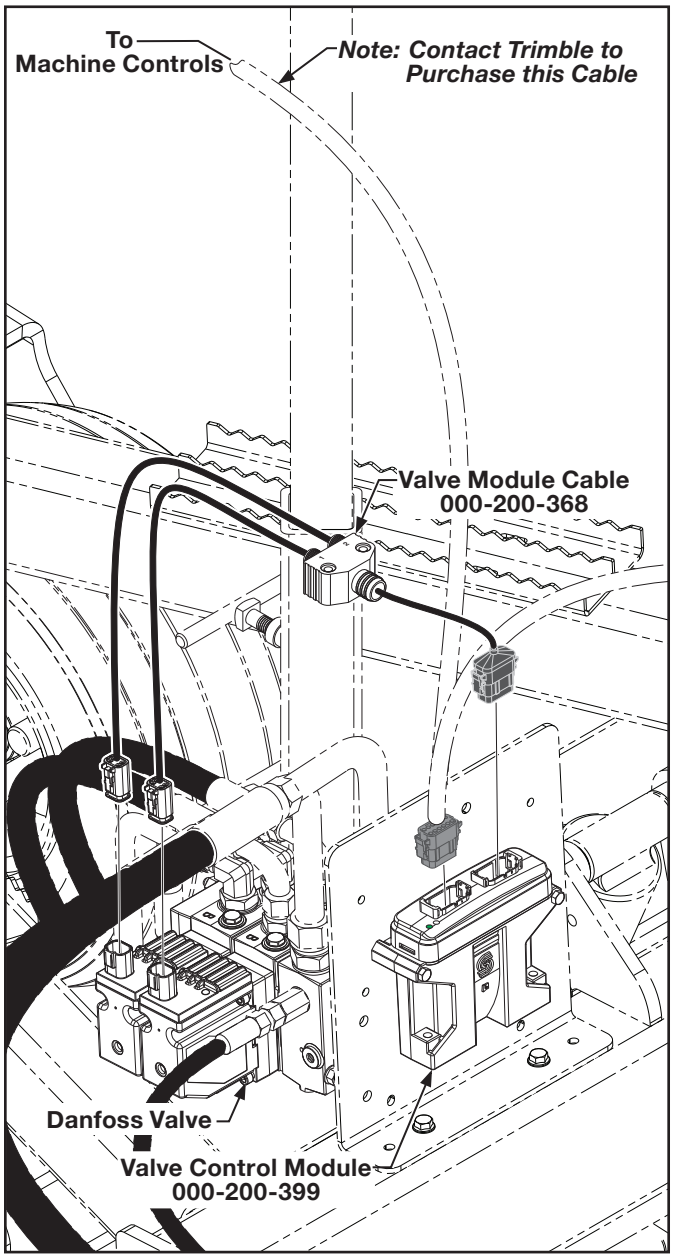


Figure 5-5. Trimble Cable to Module Controller

If the optional joystick is to be installed (see **Figure 5-6**), plug the joystick cable into the Lightbar/OEM Joystick Connector on the cable purchased from Trimble. Install the vacuum cup as described on **page 7.5**.

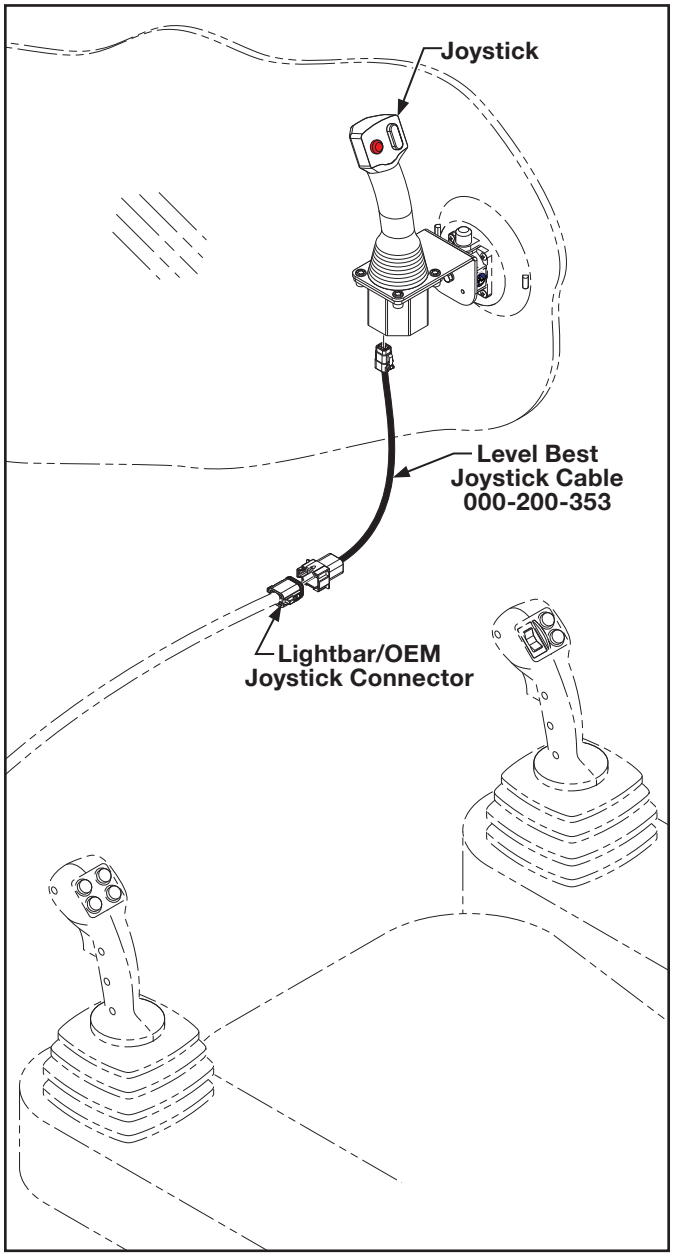


Figure 5-6. Joystick with Cable

Auxiliary joystick - A standalone joystick (see **Figure 5-2 on page 5.4**) provides selection of automatic and manual control. When in manual control, the grading box can be raised and tilted as desired (see **Figure 1-2. Optional Joystick Functions on page 1.1**). A suction cup allows installation of the joystick on a side window.

(for future use)

TRIMBLE EARTHWORKS GO

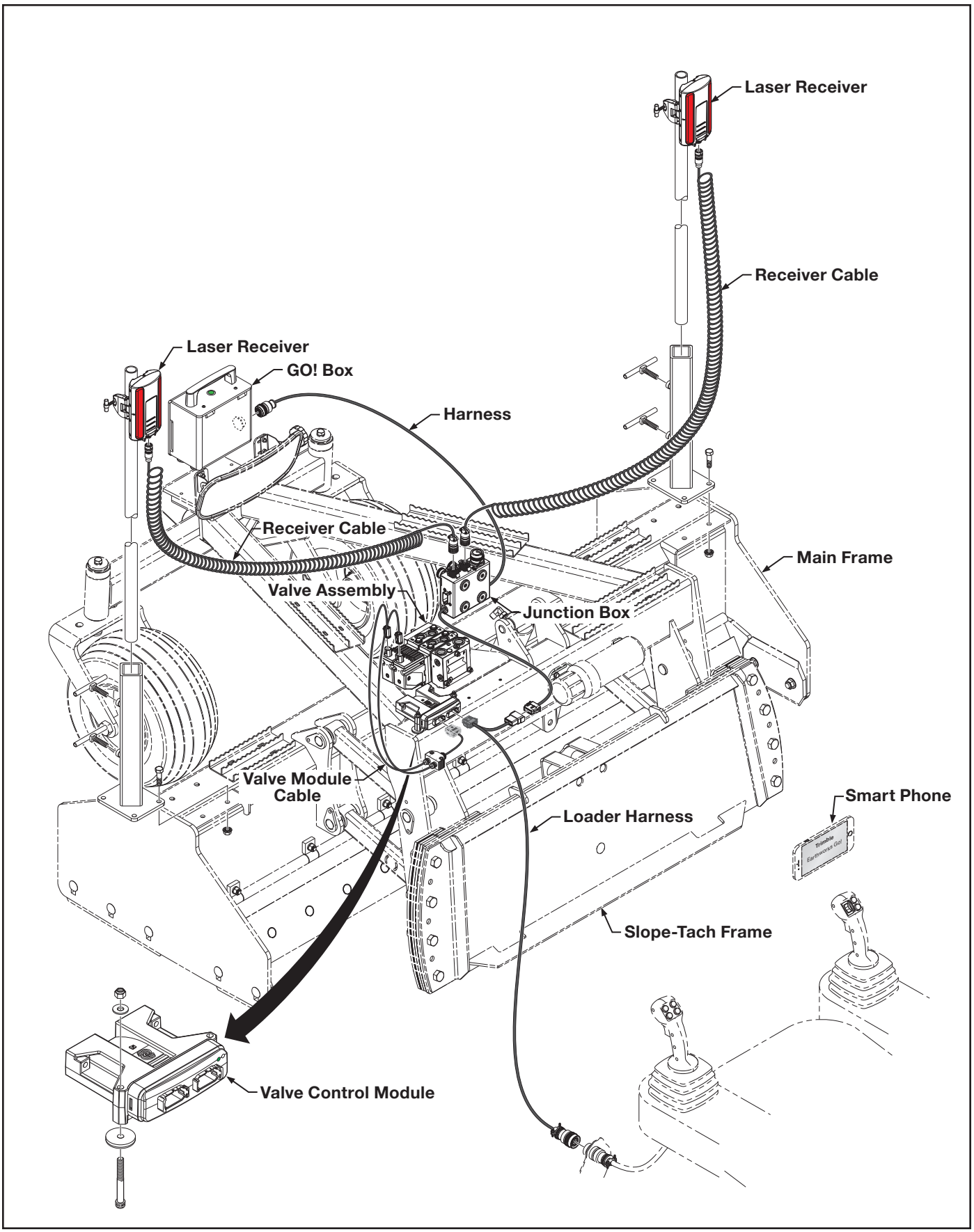


Figure 6-1. General Arrangement for Earthworks GO

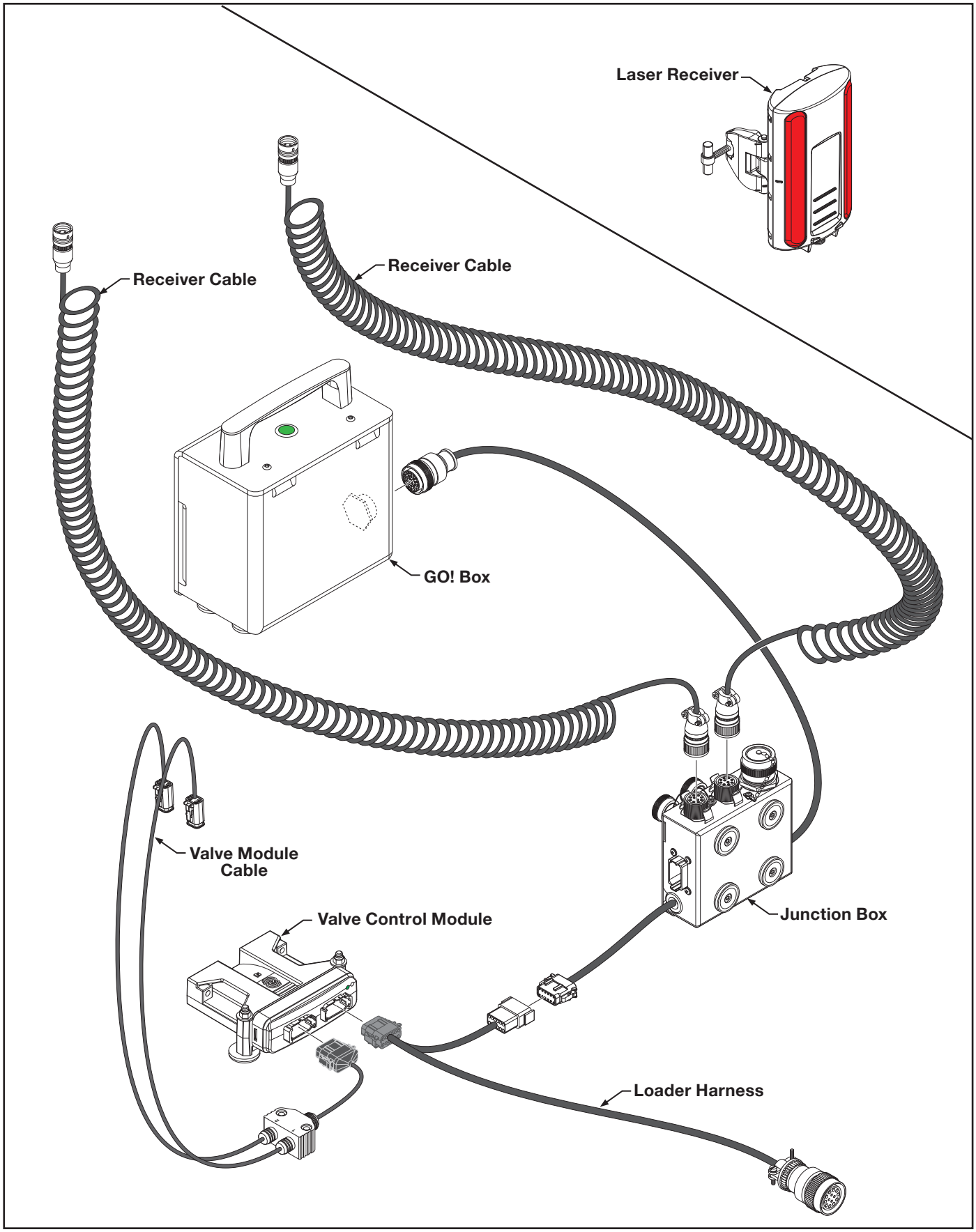


Figure 6-2. Earthworks GO Laser Receiver, Cables and Box

(for future use)

SPECIFICATIONS AND MAINTENANCE

SPECIFICATIONS

Dimensions

Model	PD-72	PD-84	PD-96
Box Width	72 in. (183 cm)	84 in. (213 cm)	96 in. (244 cm)
Overall Width	75.25 in. (191 cm)	87.25 in. (222 cm)	99.25 in. (252 cm)
Total Length	71.25 in. (181 cm)		
Box Capacity, Front	11.5 ft^3 (0.33 m^3)	13.4 ft^3 (0.38 m^3)	15.3 ft^3 (0.43 m^3)
Box Capacity, Rear	7.0 ft^3 (0.20 m^3)	8.0 ft^3 (0.23 m^3)	9.0 ft^3 (0.25 m^3)
Weight	1885 lbs. (855 kg)	1935 lbs. (878 kg)	1985 lbs. (900 kg)

PD Series Hydraulic Valve

Valve Type	Danfoss PVG32
Minimal Flow Rate	12 GPM (45.4 LPM)
Maximum Flow Rate	28 GPM (106 LPM)
Maximum Hydraulic Pressure	4060 psi (280 bar)

MAINTENANCE

The rugged and durable Level Best grading box is built to last, but as with all equipment, a few minutes of routine care, maintenance, and cleaning can extend the life of the system.

Storage and Transport

Most often the grading box and its hydraulic controls remain on the machine. However, the Automatic Control System components should be stored in a safe, protected place when not in use. Protect the cable connections by installing the covers supplied.

Cleaning

The Control Panel is water-resistant. It can be cleaned with mild soap, water, and a damp, soft cloth. Do not submerge the Control Panel or direct high pressure spray at it. Do not use a dry cloth to wipe the laser receiver or Control Panel as scratching may occur.

Cables and Hoses

Check all cables and hoses regularly for signs of wear and damage. Keep cable connections clean and free from dirt and corrosion. If a cable has been damaged, do not attempt to repair. Incorrect or poor connections can cause damage to your Automatic Control System.

When applicable, check the hydraulic hoses. Look for areas where the hoses could rub against each other or another object as they expand and contract under pressure. Check the hydraulic fittings for tightness.

Machine

Check areas that affect the Automatic Control system function and accuracy, such as looseness or play in the cylinders or wear on the box's cutting edge. Looseness in the connection to the skid steer, such as in the adaptor plate, will cause inaccurate depth positioning.

Also check the skid steer routinely for wear to its components, such as loader pins and quick-attach linkage, ensuring it is operating properly.

Loader Hydraulics

Change the oil and filter per loader manufacturer recommendations to ensure proper function of your Level Best grading box.

SERVICE

If the Automatic Control System is not functioning properly, the first step is to determine the problem component. Use the Troubleshooting Chart to determine possible causes and remedies. The following test equipment is needed:

- Voltage/Ohm Meter
- Rotating Laser or Laser Simulator

Cable Wiring Diagrams and troubleshoot electrical problems contact your local Machine Control Dealer.

Shims and Slide Pads

The slope portion of the Level Best grading box rides on two non-greaseable oil-impregnated plastic retaining pads. These pads may wear over time and shims may need to be removed to ensure a tight fit. Periodically check the pads for signs of wear or gaps between the pad material and the metal plate. If required, remove the 1/16-inch shim (do not discard) by removing the bolts as shown. Do each side, one at a time, ensuring that the bolts are tight before moving to the other side.

Every Level Best attachment is tested before leaving the factory. But if, after a wear-in period, the slope portion still seems tight, contact ATI Corporation for additional shims if required.

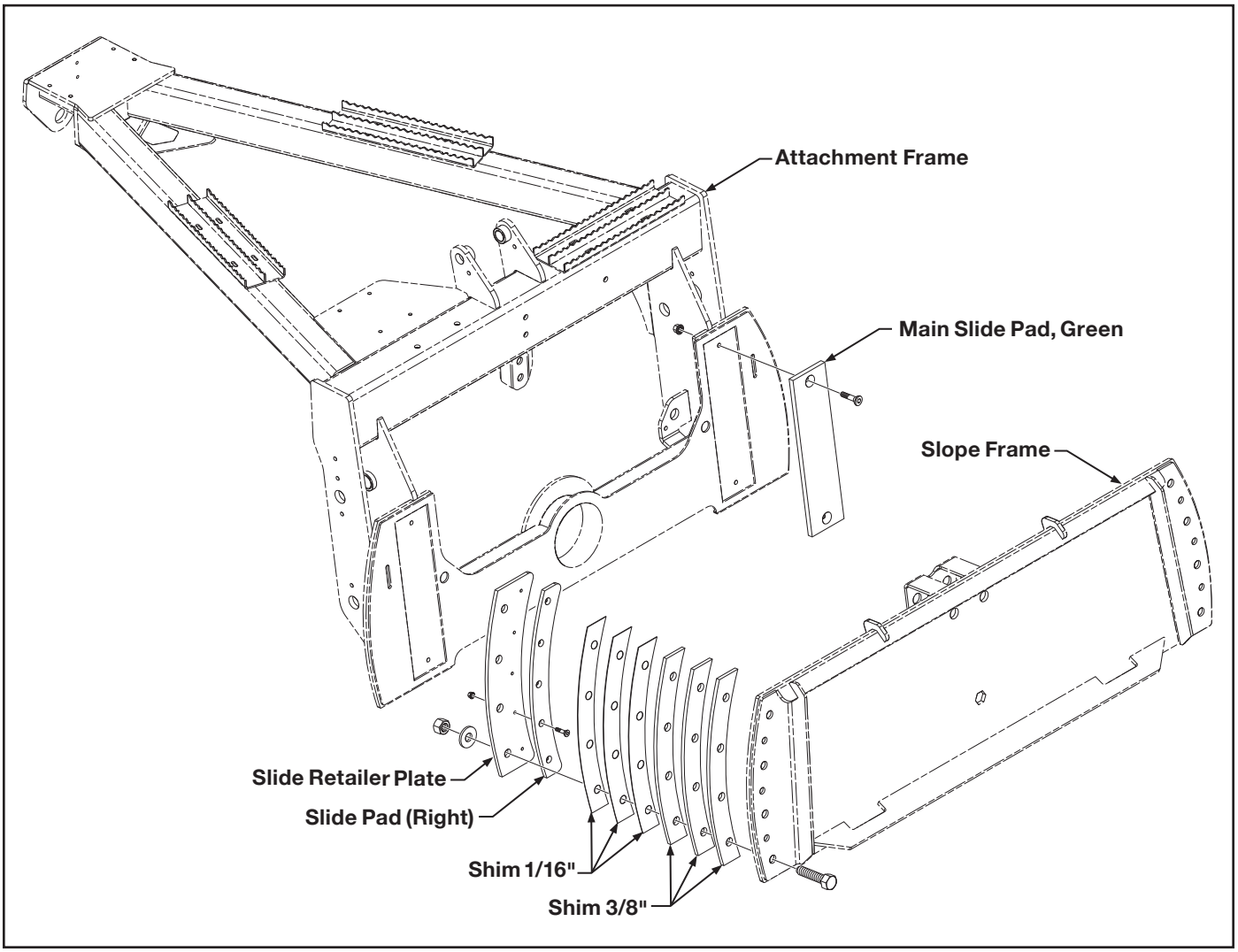


Figure 7-1. Shims and Slide Pads

HUB GREASING INSTRUCTIONS

The hub bearings on Level-Best products are pre-greased from factory for a long service life. However, it is strongly suggested that the axle and hub assembly be removed and disassembled annually to repack with grease and inspect the bearings for wear or damage.

The hubs now have an option to add grease through a zerk during routine maintenance. When greasing the hubs with this method please adhere to the following guidelines:

DO NOT OVER GREASE the bearings. One or two shots of grease every 100 operating hours is sufficient to keep the bearings lubricated. Forcing excessive amounts of grease into the hub will push the seals off their seats and expose the bearings to external dirt, use a Multi-Purpose grease.

Adding external grease is no replacement for proper maintenance practices. Annual tear-down and repacking of the bearings is still required to ensure a long life of the machine and minimal downtime.

NOTE: Check Hydraulic System Components for wear and/or leaks.

Check and tighten all bolts and nuts for scraper blade and end blades, weekly.

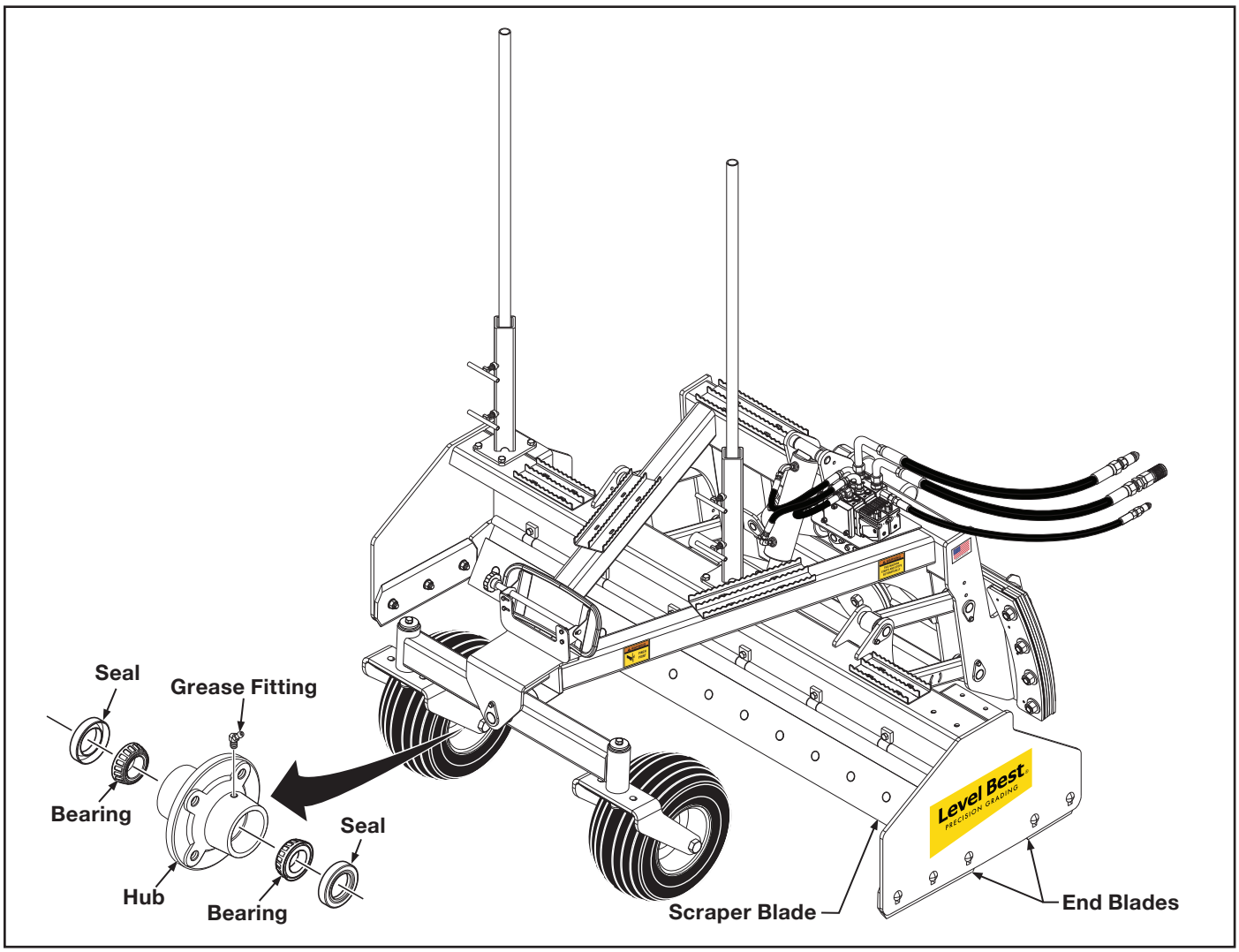


Figure 7-2. Lube and Maintenance

HYDRAULICS

Danfoss PVG-32 Hydraulic Valve

The hydraulic valve is setup at the factory and should not need any adjustments. If there are any changes required, they should be done by an authorized factory technician.

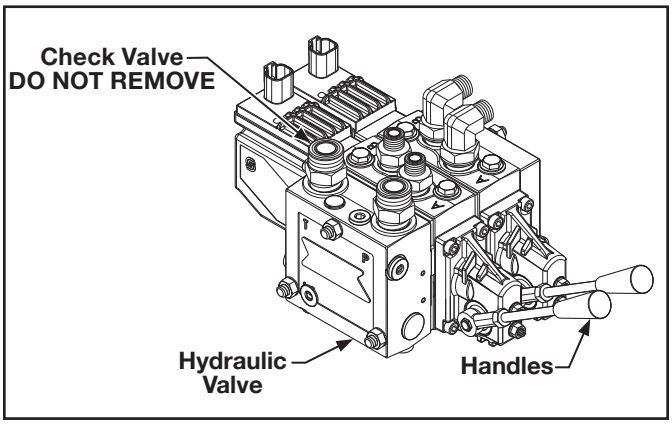


Figure 7-3. Hydraulic Valve (Danfoss PVG-32)

NOTE: Do not remove the check valve. Removal will void the warranty.

The handles are for manual actuation of the valve, can be found in canister.

Hydraulic Hose Connection

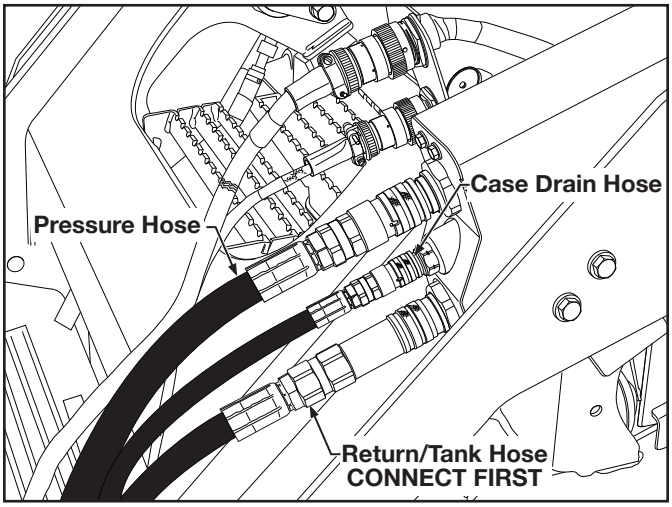


Figure 7-4. Hydraulic Hose Connections to Skid Steer

⚠ CAUTION

The return line must be connected before the pressure line. Pressurizing the valve without an outlet will damage the valve and void the valve warranty.

NOTE: Check the manufacture of your skid steer for the correct hose connections.

VACUUM CUP

WARNING: This product can expose you to chemicals including diethylhexyl phthalate (DEHP, which is known to the State of California to cause cancer and birth defects or other reproductive harm.

For more information go to www.P65Warnings.ca.gov.

Installation

1. Clean the mounting surface and, if needed, the face of the vacuum cup (see **Cleaning**).
2. Position the cup on the mounting surface so the plunger is accessible and visible to the operator.
3. Pump the plunger until the cup attaches completely. When the red line on the plunger is hidden, the cup is ready for use.
4. Check the plunger frequently to make sure the cup remains securely attached. If the red line appears, pump the plunger until the red line is hidden again.

Release

1. Grasp and hold the joystick and cup assembly.
2. Pull one of the release tabs until the cup disengages completely.

CAUTION

Remove the cup when not in use. If the cup remains attached to a hot surface (e.g,. in direct sunlight) for an extended period, the rubber pad could bond to the mounting surface, resulting in damage to the surface or to the pad when it is removed.

Maintenance Service

Regularly make sure the vacuum cup's air filter is in place. If not, discontinue use until the filter is replaced.

Since aging and water reduce the capacity of the rubber pad, it should be replaced at least once every 2 years or whenever damage is discovered.

If the cup does not function normally, the cup face may be dirty or damaged, or the pump may require service. First clean the cup face as directed.

Cleaning

1. Remove the air filter from the cup face.
2. Use a clean sponge or lint-free cloth to apply soapy water or another mild cleanser to cup face.

CAUTION

To prevent liquid from contaminating the pump, hold the cup face-down or cover the suction hole in the filter recess while using any liquid.

3. Wipe all residue from the cup face.
4. Allow the cup to dry and reinstall the air filter.

Storage

Store in a clean, dry location out of direct sunlight. Protect the cup face from damage using the pad cover (when supplied) or another appropriate means.

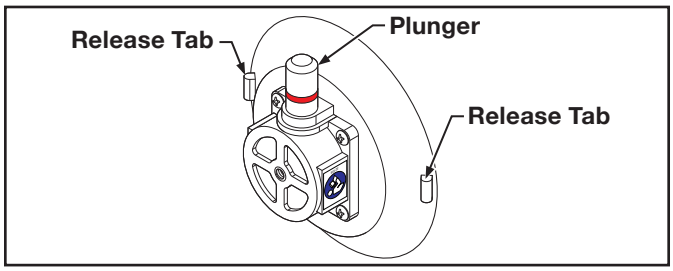


Figure 7-5. Vacuum Cup

Figure 2-1 through **Figure 2-11** show the functions and pinouts of the various integrated control systems based on the skid steer manufacturer. Only the functions and pinouts used are specified.

SERVICE RECORD

DATE	SERVICE	NOTES

SERVICE RECORD

DATE	SERVICE	NOTES

(for future use)

TROUBLESHOOTING

SYMPTOM	POTENTIAL CAUSE	REMEDY
Grading box has trouble staying on grade.	Rotating laser out of range.	Ensure laser receiver is within specified range of rotating laser.
	Laser beam being reflected.	Ensure rotating laser's light is not reflecting off outer surfaces (windows, windshields, mirrors, etc.) causing multiple readings by the laser receivers.
	Multiple laser beams.	Ensure that there are no other lasers operating on the job site or nearby.
	Laser deadband set too narrow.	Ensure the deadband (accuracy) setting is appropriate for rough grading.
	Travel speed is too fast for grade tolerance.	Slow down.
	Hydraulic response too quick.	Decrease the valve speed setting.
Grading box doesn't return all the way to on grade.	Valve offsets need to be raised.	Call dealer.
Grading box keeps driving past on grade, and bouncing.	Valve offsets need to be lowered.	Call dealer.
Grading box doesn't follow receiver or control panel grade display.	Valve cables are connected to wrong sides.	Check to make sure the valve cable branches are hooked up properly. Elevation (left) branch of cable to the Elevation (left) Receptacle on the Valve, and Slope (right) branch of cable to the Slope (right) Receptacle on the Valve.

SYMPTOM	POTENTIAL CAUSE	REMEDY
Grading box does not raise or lower.	Control Panel not turned on.	Push the power switch.
	No hydraulic flow to grading box.	Ensure hydraulic control handle of skid steer is in correct position.
	Cables not connected correctly.	Ensure auxiliary hydraulics are on or in continuous flow mode. Check valve cable, valve and valve coils for visible damage. Move directional valve spool manually using the overrides, with the handles provided in Manual Canister. (see **Figure 7-3**.) **⚠WARNING** **Be sure to stay clear of any moving parts of the grading box.** If the grading box moves, refer to Electrical problems. If the grading box does not move, refer to Hydraulic problems.
	Electrical problems.	Check valve cable, valve and valve coils for visible damage. Use an ohmmeter to check cable for continuity. Contact ATI Corporation for pinouts.
	Hydraulic problems.	Confirm hydraulic flow through the manifold and returning to the power source through the “T” hose. Contact ATI Corporation for help troubleshooting the hydraulic manifold.
Grading box moves in unexpected/erratic direction.	Solenoid cable installed incorrectly.	Verify termination marked “Elevation” is installed in socket of elevation bank on Danfoss valve. Confirm respective termination on slope bank.

PARTS ILLUSTRATIONS

Serial Number Information

It is very important that the correct serial number is provided when ordering parts. The serial number plate is located on the main frame. Please mark the model and serial number of your Para-Level Grading Box in the space provided below in case the plate on your Para-Level Grading Box gets lost or damaged.

Model..... Serial Number .....

Dealer Name ..... Dealer Phone Number .....

Where To Get Parts And Service

When replacement parts and service are required, ATI Corporation recommends returning to the dealer from which the product or optional kit was purchased. By going to the dealer, you are dealing with people that understand and know ATI products. Our dealers have the experience servicing these machines and stock the most common parts required to keep your equipment in top working condition.

How To Order Parts

Parts lists contained in this book have been prepared to help you when ordering spare and/or replacement parts. Your order will be filled promptly and accurately when the following information is provided:

1. Model and serial number of the unit. (This specifically identifies the equipment you have and permits us to verify the part numbers in your order.)
2. The parts list page number and catalog number. Include catalog revision number, if applicable.
3. The **Item** number for each part. **Item** numbers on the parts list page correspond with the numbers shown on the illustration.
4. **Part Number** as it appears in the parts list. In most cases this will be a nine-digit number; for example: 315-005-000.
5. The **Description** for the part as it appears on the parts list page.

When a complete assembly is needed, use the assembly number given in the parts list. If no assembly number is given, order by main assembly title and list only the item numbers you want. For example: “Wheel Frame Assembly per 315-509-000, Items 2 through 8, inclusive”.

The part ordered may have a new part number, or the part may have been replaced by a newer design with a different part number. In these cases your acknowledgement, shipping papers and invoices will be written listing the current part number first; the old part number you referred to will follow the part description.

Our purpose in doing this is to tell you that the parts are fully interchangeable. This will avoid any unnecessary correspondence or delay in processing your order. We suggest that you add any new number to your parts lists for future use.

NOTE: ATI Corporation reserves the right to discontinue models at any time, change specifications, and improve design without notice and without incurring obligation on goods previously purchased and to discontinue supplying any part listed, when the demand does not warrant production.

LIST OF PARTS ILLUSTRATIONS

Figure 9-1. Main Frame and Cutting Edges

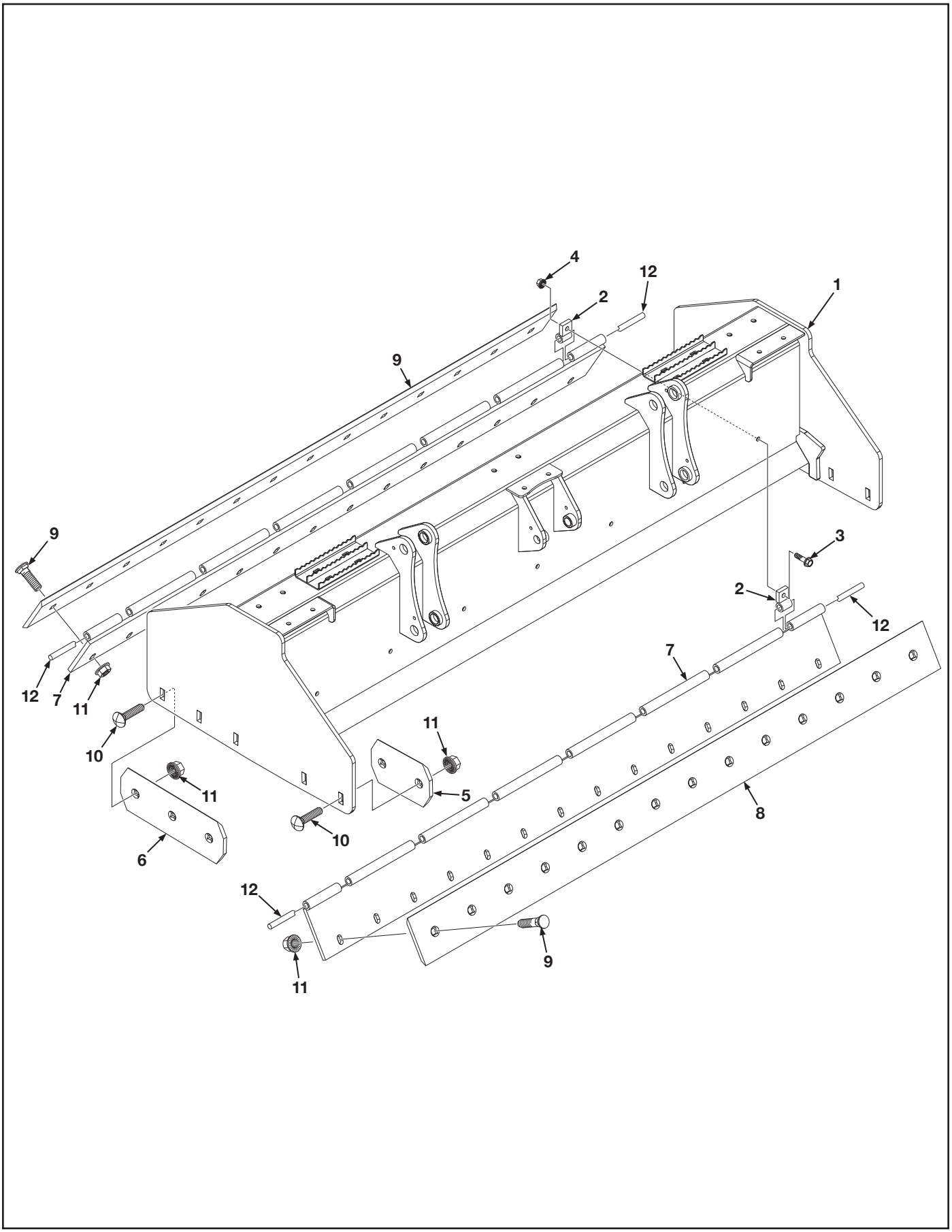


Figure 9-1. Main Frame and Cutting Edges

Item	Part No.	Qty	Description
1	315-101-100	1	Frame, Main 6'
	315-102-100	1	Frame, Main 7'
	315-103-100	1	Frame, Main 8'
2	315-561-010	14	Hinge, Back Plate, 6' & 7'
	315-561-010	18	Hinge, Back Plate, 8'
3	000-150-376	AR	Bolt, Flange Head, 1/2"-13UNC x 2" Long
4	000-158-111	AR	Nut, Serrated Flange, 1/2"-13UNC
5	000-190-150	2	Edge, Cutting, End, DBF, 9-1/2" Long
6	000-190-149	2	Edge, Cutting, End, DBF, 16-3/4" Long
7	315-563-100	2	Mount Assembly, Blade 6'
	315-564-100	2	Mount Assembly, Blade 7'
	315-565-100	2	Mount Assembly, Blade 8'
8	000-190-075	2	Edge, Cutting, DBF, 72" Long
	000-190-077	2	Edge, Cutting, DBF, 84" Long
	000-190-079	2	Edge, Cutting, DBF, 96" Long
9	000-150-258	AR	Bolt, Plow, 5/8"-11UNC x 1-3/4" Long
10	000-150-253	10	Bolt, Carriage, 5/8"-11UNC x 1-3/4" Long
11	000-158-142	AR	Nut, Serrated Flange, 5/8"-11UNC
12	000-161-127	2	Pin, Hinge, 6'
	000-161-128	2	Pin, Hinge, 7'
	000-161-129	2	Pin, Hinge, 8'

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Figure 9-2. Attachment Frame and Related Parts

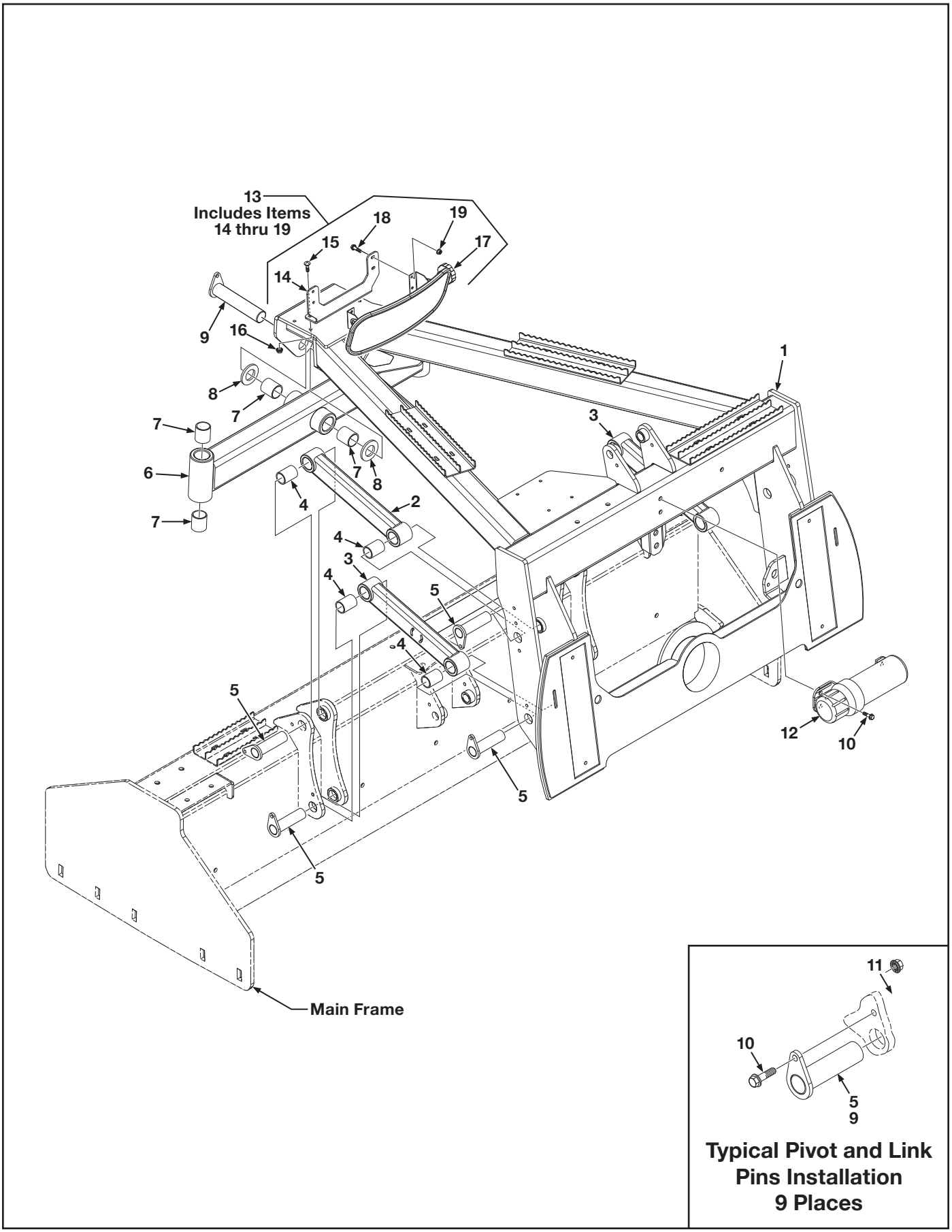

Figure 9-2. Attachment Frame and Related Parts

Item	Part No.	Qty	Description
1	315-631-000	1	Frame, Attachment
2	315-621-100	2	Link, Lift, Box, Includes Item 4
3	315-621-000	1	Link, Lift, Torsion, Box, Includes Item 4
4	000-176-183	8	Bushing, Link, 1-1/2" OD x 1-1/4" ID x 2" Long
5	000-161-165	8	Pin, Link, 1-1/4" Dia x 4-5/8" Long
6	315-568-000	1	Axle Assembly, Front, Includes Item 7
7	000-176-171	6	Bushing, Wheel Frame, 1-3/4" OD x 1-1/2" ID x 1-1/2" Long
8	000-155-002	2	Bushing, Washer, 2-1/4" OD x 1-1/2" ID x 10 Gauge
9	000-161-166	1	Pin, Pivot, 1-1/2" Dia. x 7-3/4" Long
10	000-150-078	12	Bolt, Serrated Flange, 5/16"-18UNC x 1" Long
11	000-158-064	9	Nut, Serrated Flange, 5/16"-18UNC
12	001-001-083	1	Canister, Operators Manual
13	001-001-141	1	Kit, Mirror & Bracket, Includes Items 14 thru 19
14	001-001-140	1	Bracket, Mounting
15	000-150-372	2	Bolt, Carriage, 5/16"-18UNC x 1" Long
16	000-158-064	2	Nut, Serrated Flange, 5/16"-18UNC
17	001-001-097	1	Mirror
18	000-150-046	4	Bolt, Serrated Flange, 1/4"-20UNC x 1/2" Long
19	000-158-048	4	Nut, Serrated Flange, 1/4"-20UNC

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Figure 9-3. Caster Fork and Wheel

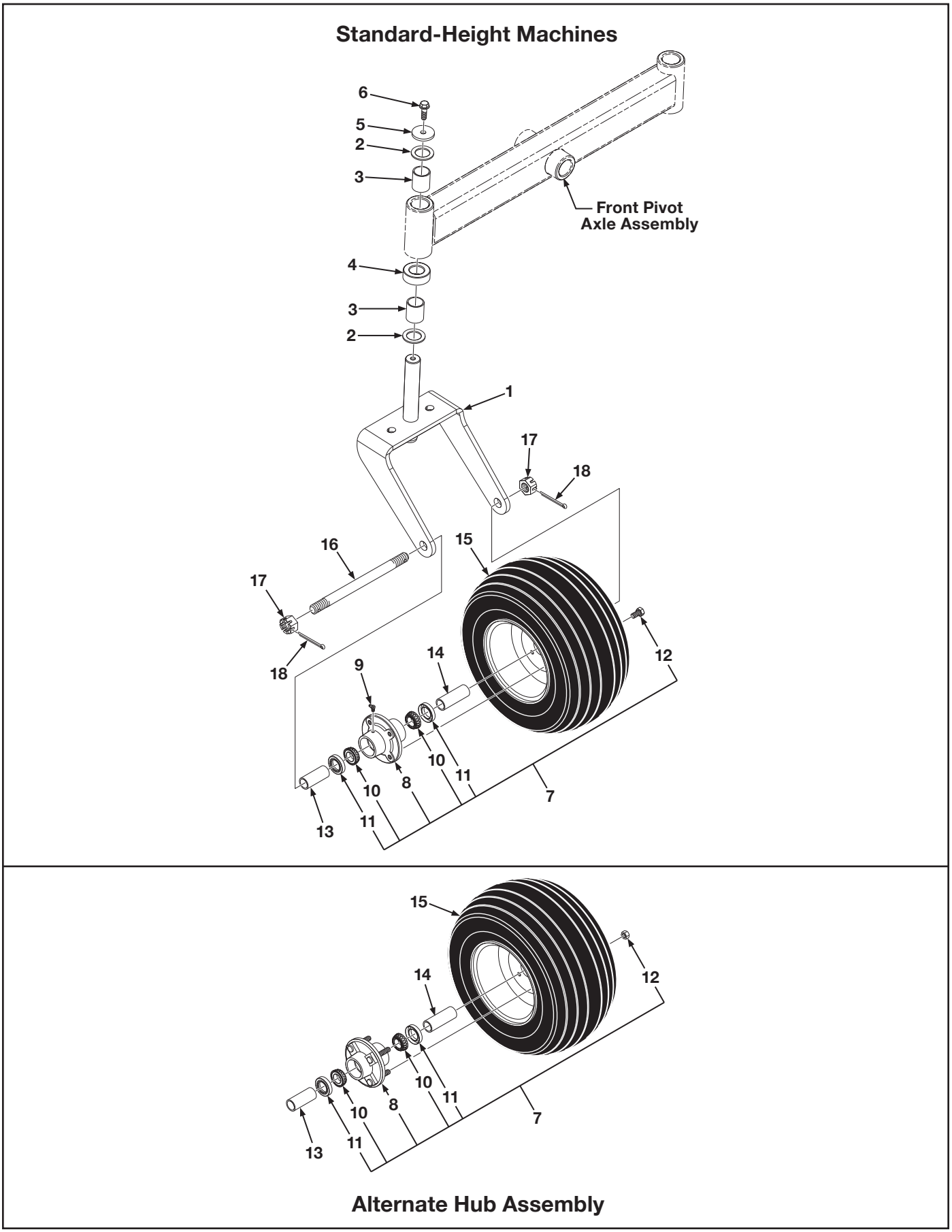

Figure 9-3. Caster Fork and Wheel

Item	Part No.	Qty	Description
1	315-548-010	2	Fork, Caster, Extended
2	000-155-002	2	Bushing, Washer, 2-1/4" OD x 1-1/2" ID x 10 Gauge
3	000-176-171	4	Bushing, Wheel Frame, 1-3/4" OD x 1-1/2" ID x 1-1/2" Long
4	315-568-056	2	Spacer, Caster, 2-3/4" OD x 1-1/2" ID x 1" Thick
5	000-155-004	2	Washer, Flat, 2-1/4" OD x 17/32" ID x 1/4" Thick
6	000-150-375	2	Bolt, Serrated Flange, 1/2"-13UNC x 1-1/4" Long
7	001-001-069	2	Hub Assembly, Includes Items 8 thru 12
		2	Hub Assembly, Includes Items 8 thru 12 (Alternate Hub Assembly)
8	001-001-074	1	Hub, Wheel, With Outer Race, Includes Item 9
9	NSS	1	Fitting, Grease, 65°
10	000-176-184	2	Bearing, Roller, Tapered, 1" Dia. Bore
11	000-166-457	2	Seal, Grease, 2" OD x 1-1/4" ID
12	000-150-218	4	Bolt, Lug, 1/2"-20UNF x 1-1/4" Long
	000-158-120	4	Nut, Lug, Hex, 1/2"-20UNF (Alternate Hub Assembly)
13	315-598-000	2	Spacer, Wheel Bearing, Long
14	315-597-000	2	Spacer, Wheel Bearing, Short
15	001-001-057	2	Wheel/Tire, Foam-Filled, 18.5/8.50-8
16	315-553-000	2	Axle, Caster, 1-1/4" -14UNF x 12-1/2" Long
17	000-158-193	4	Nut, Castle, 1"-14UNF
18	000-161-078	4	Pin, Cotter, 1/8" Dia. x 2" Long

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Figure 9-4. Hydraulics & Related Parts

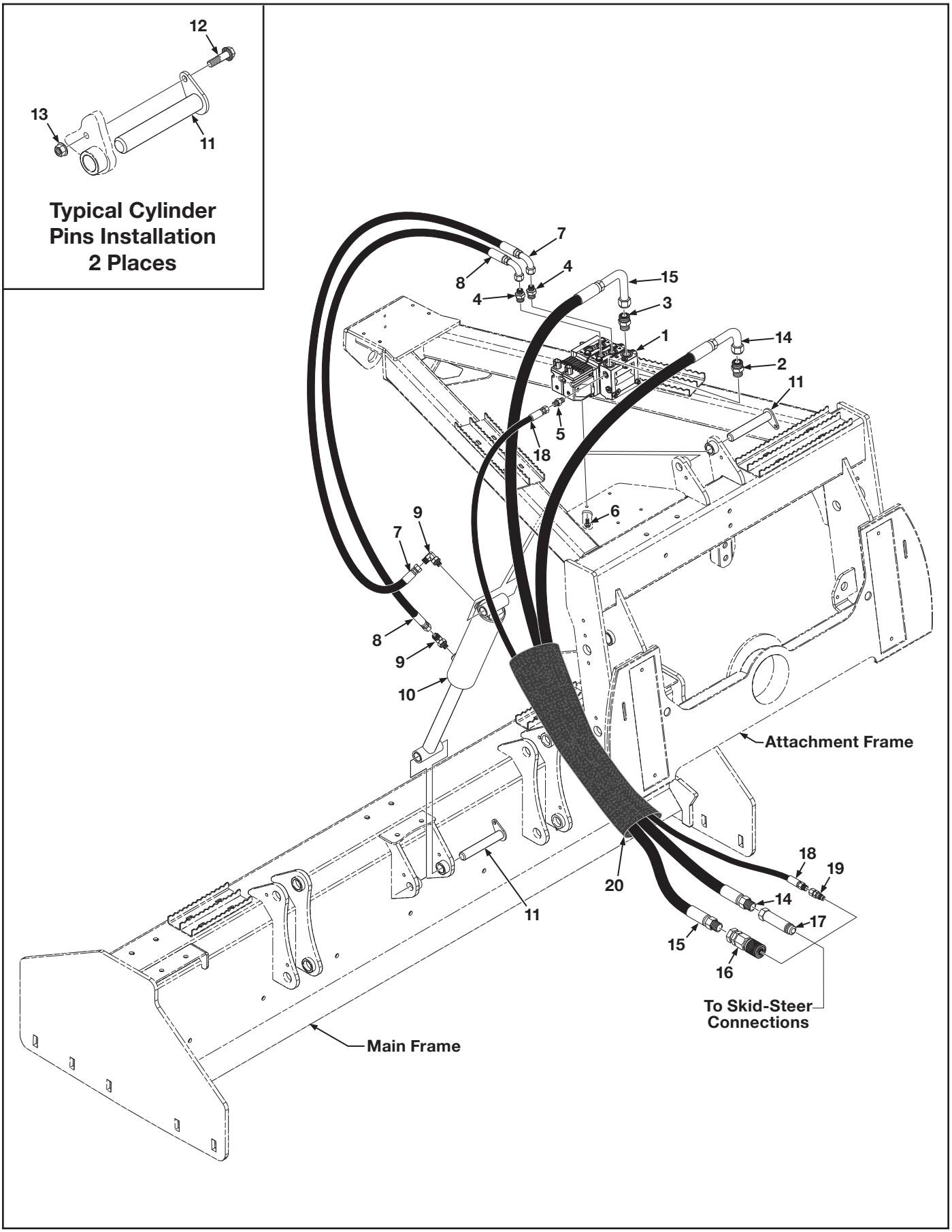

Figure 9-4. Hydraulics & Related Parts

Item	Part No.	Qty	Description
1	000-166-812	1	Valve Assembly, Hydraulic, PVE32H, Includes Items 2 thru 6
2	NSS	1	Valve, Check **(DO NOT REMOVE FROM ITEM 1)**
3	000-166-694	1	Fitting, Adapter, Straight, 12OFS x 12MB (FS6400-12-12)
4	000-166-699	2	Fitting, Adapter, Straight, 6OFS x 10MB (FS6400-06-10)
5	000-166-798	1	Fitting, Adapter, 06OFS x 05MB
6	000-150-074	4	Bolt, Serrated Flange, 5/16"-18UNC x 3/4" Long
7	000-166-736	1	Hose Assembly, 3/8" Dia x 26" Long x 6FFX x 6FFX90L, 3,000 PSI
8	100-166-736	1	Hose Assembly, 3/8" Dia x 26" Long x 6FFX x 6FFX90L, 3,000 PSI
9	000-166-697	2	Elbow, 90°, 6OFS x 6MB
10	000-166-690	1	Cylinder, Hydraulic, 3" Bore x 8" Stroke
11	000-161-169	2	Pin, Pivot, 1" Dia. x 6-7/8" Long
12	000-150-078	2	Bolt, Serrated Flange, 5/16"-18UNC x 1" Long
13	000-158-064	2	Nut, Serrated Flange, 5/16"-18UNC
14	000-166-734	1	Hose, 3/4" Dia. x 70" Long x 12MB x 12FFX90, 4,060 PSI
15	000-166-735	1	Hose, 3/4" Dia. x 74" Long x 12MB x 12FFX90L, 4,060 PSI
16	000-166-069	1	Coupler, Quick Disconnect, Flat Face, Female - 1/2" (Pressure Line)
17	000-166-676	1	Coupler, Quick Disconnect, Flat Face, Male -1/2" (Tank Line)
18	000-166-795	1	Hose Assembly, 3/8" Dia x 70" Long x 6FFX x 8MB, 3,000 PSI
19	000-166-797	1	Coupler, Quick Disconnect, Flat Face, Female - 3/8"
20	000-166-811	1	Sleeve, Nylon, Hydraulic Hoses
			BH-Bulkhead MP-Male Pipe FP-Female Pipe FPX-Female Pipe Swivel FFX- Female O-Ring Flat Face Swivel MB-Male O-Ring Boss FB-Female O-Ring Boss MJ-Male JIC FJ-Female JIC FJX-Female JIC Swivel OFS-O-Ring Face Seal OFSBH-O-Ring Face Seal Bulkhead

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Figure 9-5. Hydraulic Valve Assembly

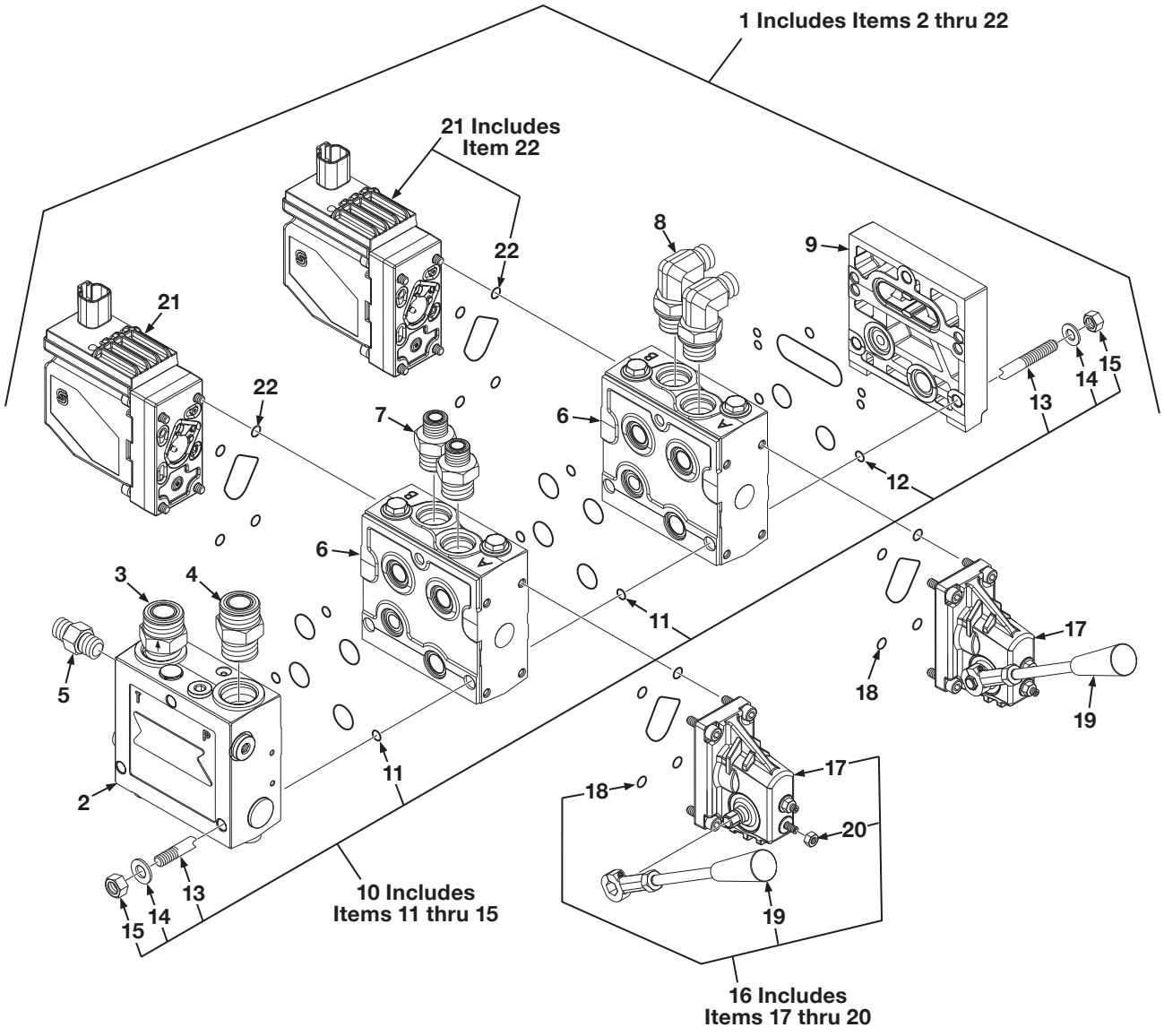

Figure 9-5. Hydraulic Valve Assembly

Item	Part No.	Qty	Description
1	000-166-812	1	Valve Assembly, Hydraulic, PVE32H, Includes Items 2 thru 22
2	NSS	1	Inlet, PVG32
3	NSS	1	Valve, Check **(DO NOT REMOVE FROM ITEM 2) 000-166-824**
4	000-166-694	1	Fitting, Adapter, Straight, 12OFS x 12MB (FS6400-12-12)
5	000-166-798	1	Fitting, Adapter, 06OFS x 05MB
6	NSS	2	Module, Work Section
7	000-166-699	2	Fitting, Adapter, Straight, 6OFS x 10MB (FS6400-06-10)
8	000-166-698	2	Elbow, 90°, 6OFS x 10MB (FS6801-06-10)
9	NSS	1	End Plate
10	000-166-782	1	Kit, Tie-Rod, Includes Items 11 thru 15
11	NSS	2	Seals
12	000-166-775	1	Kit, Seal, End Plate
13	NSS	3	Tie Rods
14	NSS	6	Washer
15	NSS	6	Nut
16	000-166-799	2	Kit, Handle Assembly & Housing, Includes Items 17 thru 20
17	NSS	2	Housing, Activation, Mechanical
18	000-166-820	2	Kit, Seal, Mechanical Activation
19	000-166-774	1	Handle Assembly
20	000-166-834	4	Nut
21	000-166-823	2	Electrical Coil, Includes Item 22
22	000-166-789	2	Kit, Seal, Danfoss PVEH Coil

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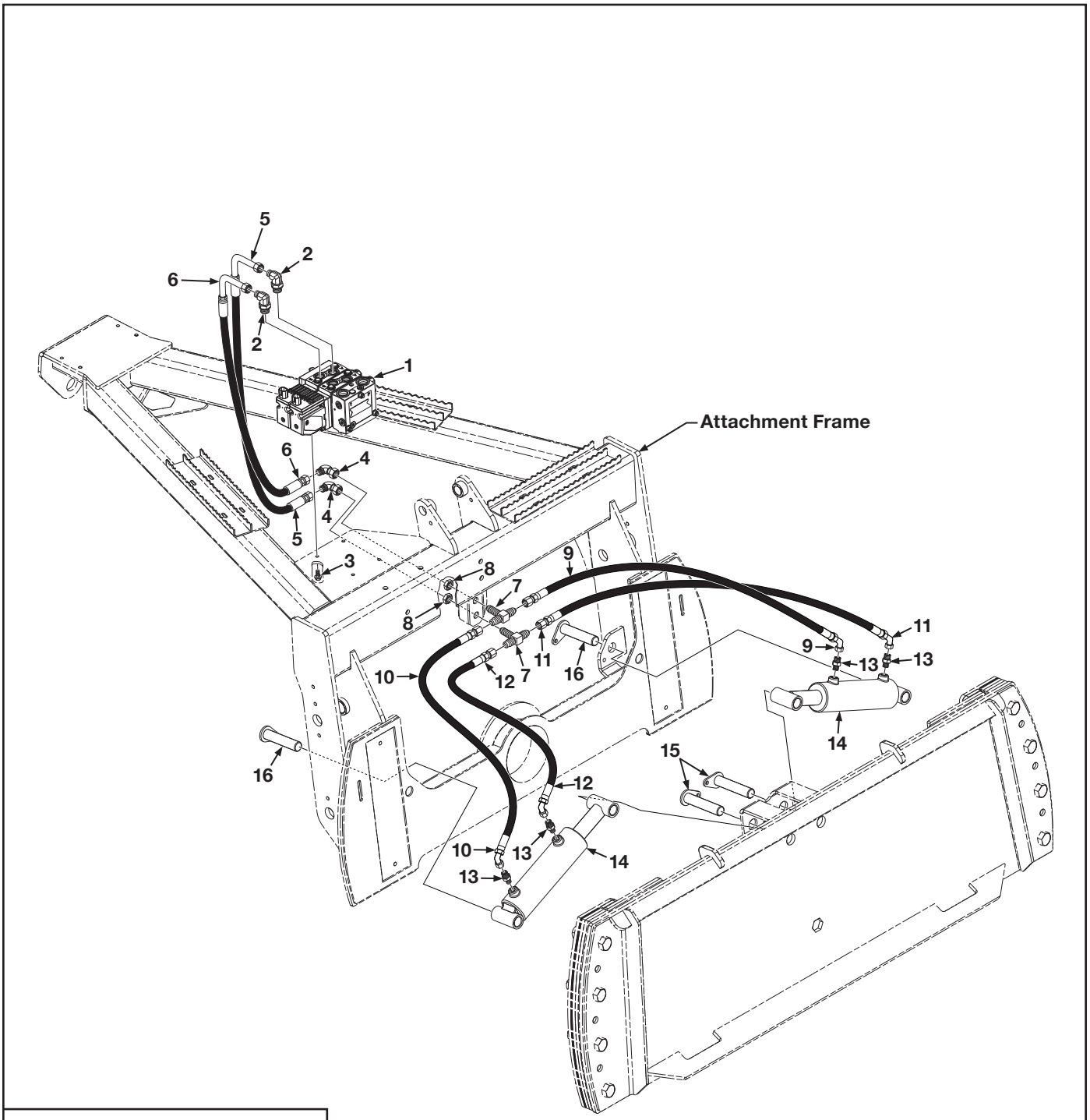
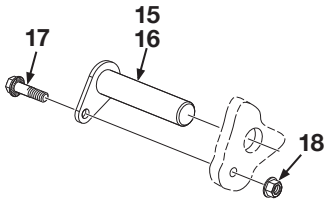
Figure 9-6. Hydraulics Slope Cylinder, Fittings and Related Parts





Typical Cylinder Pins Installation 4 Places

Figure 9-6. Hydraulics Slope Cylinder, Fittings and Related Parts

Item	Part No.	Qty	Description
1	000-166-812	1	Valve Assembly, Hydraulic, PVE32H, Includes Items 2 thru 3
2	000-166-698	2	Elbow, 90°, 6OFS x 10MB (FS6801-06-10)
3	000-150-074	4	Bolt, Serrated Flange, 5/16"-18UNC x 3/4" Long
4	000-166-738	2	Fitting, Elbow, 90°, 6OFS x 6FOFX
5	000-166-736	1	Hose Assembly, 3/8" Dia x 26" Long x 6FFX x 6FFX90L, 3,000 PSI
6	000-166-736	1	Hose Assembly, 3/8" Dia x 26" Long x 6FFX x 6FFX90L, 3,000 PSI
7	000-166-695	2	Fitting, Tee, Bulkhead Branch, 6OFS x 6OFS x 6OFSBH, Includes Item 8
8	NSS	2	Nut, Hex, Lock
9	000-166-737	1	Hose Assembly, 3/8" Dia. x 20" Long, 6FFX x 6FXX45, 3,000 PSI
10	000-166-737	1	Hose Assembly, 3/8" Dia. x 20" Long, 6FFX x 6FXX45, 3,000 PSI
11	000-166-737	1	Hose Assembly, 3/8" Dia. x 20" Long, 6FFX x 6FXX45, 3,000 PSI
12	000-166-737	1	Hose Assembly, 3/8" Dia. x 20" Long, 6FFX x 6FXX45, 3,000 PSI
13	000-166-685	4	Adapter, Straight, 6OFS x 6MB
14	000-166-680	2	Cylinder, Hydraulic, 2-1/2" Bore x 6" Stroke
15	000-161-164	2	Pin, Pivot, 1" Dia. x 5" Long
16	000-161-168	2	Pin, Pivot, 1" Dia. x 4-5/8" Long
17	000-150-078	4	Bolt, Serrated Flange, 5/16"-18UNC x 1" Long
18	000-158-064	4	Nut, Serrated Flange, 5/16"-18UNC
			BH-Bulkhead MP-Male Pipe FP-Female Pipe FPX-Female Pipe Swivel FFX- Female O-Ring Flat Face Swivel MB-Male O-Ring Boss FB-Female O-Ring Boss MJ-Male JIC FJ-Female JIC FJX-Female JIC Swivel OFS-O-Ring Face Seal OFSBH-O-Ring Face Seal Bulkhead

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Figure 9-7. Slope Frame, Shims and Related Parts

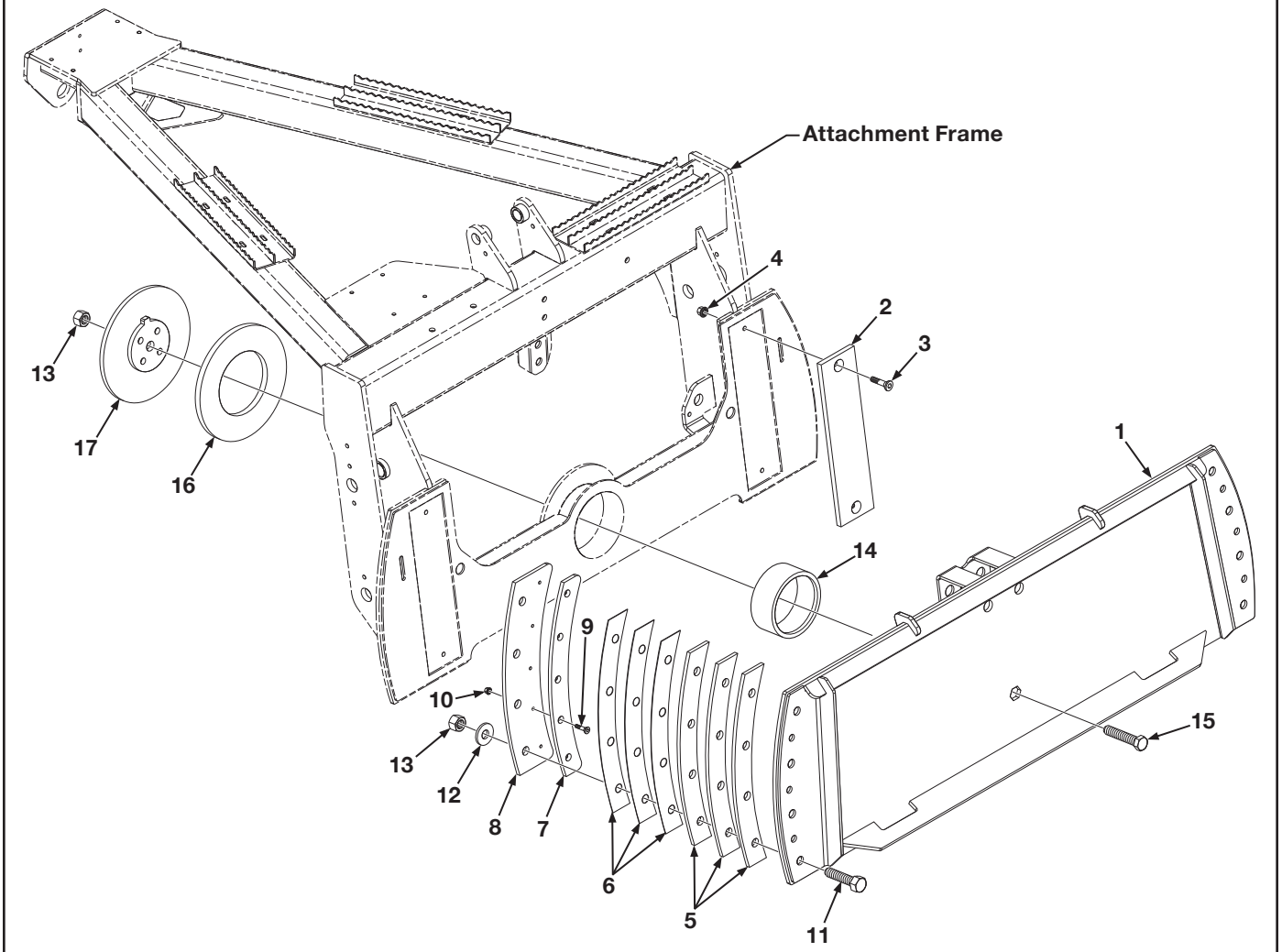

Figure 9-7. Slope Frame, Shims and Related Parts

Item	Part No.	Qty	Description
1	315-632-000	1	Frame, Slope
2	100-094-007	2	Pad, Main Slide, Green
3	000-150-130	4	Screw, Flat Head, Socket, 3/8"-16UNC x 1-1/4" Long
4	000-158-217	4	Nut, Serrated Flange, 3/8"-16UNC
5	100-094-002	AR	Shim, Retainer, 3/8"
6	100-094-003	AR	Shim, Retainer, 1/16"
7	100-094-005	1	Pad, Slide, Right (Shown)
	100-094-004	1	Pad, Slide, Left (Not Shown)
8	100-094-001	2	Plate, Slide Retainer
9	000-150-066	10	Screw, Flat Head, Socket, 1/4"-20UNC x 1" Long
10	000-158-048	10	Nut, Serrated Flange, 1/4"-20UNC
11	000-150-333	8	Bolt, Hex Head, 3/4"-16UNF x 3-1/2" Long
12	000-155-091	8	Washer, Flat, 3/4"
13	000-158-182	9	Nut, Hex, Nylon Lock, 3/4"-16UNF, **(250 ft-lbs)**
14	000-176-260	1	Bushing, Nylon, 5-1/2" OD x 5" ID x 2" Long
15	000-150-337	1	Bolt, Hex Head, 3/4"-16UNF x 5" Long
16	100-192-008	1	Disk, Slide
17	100-192-001	1	Cap, Pivot

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Figure 9-8. Laser Controls and Related Parts - Trimble Earthworks Go!

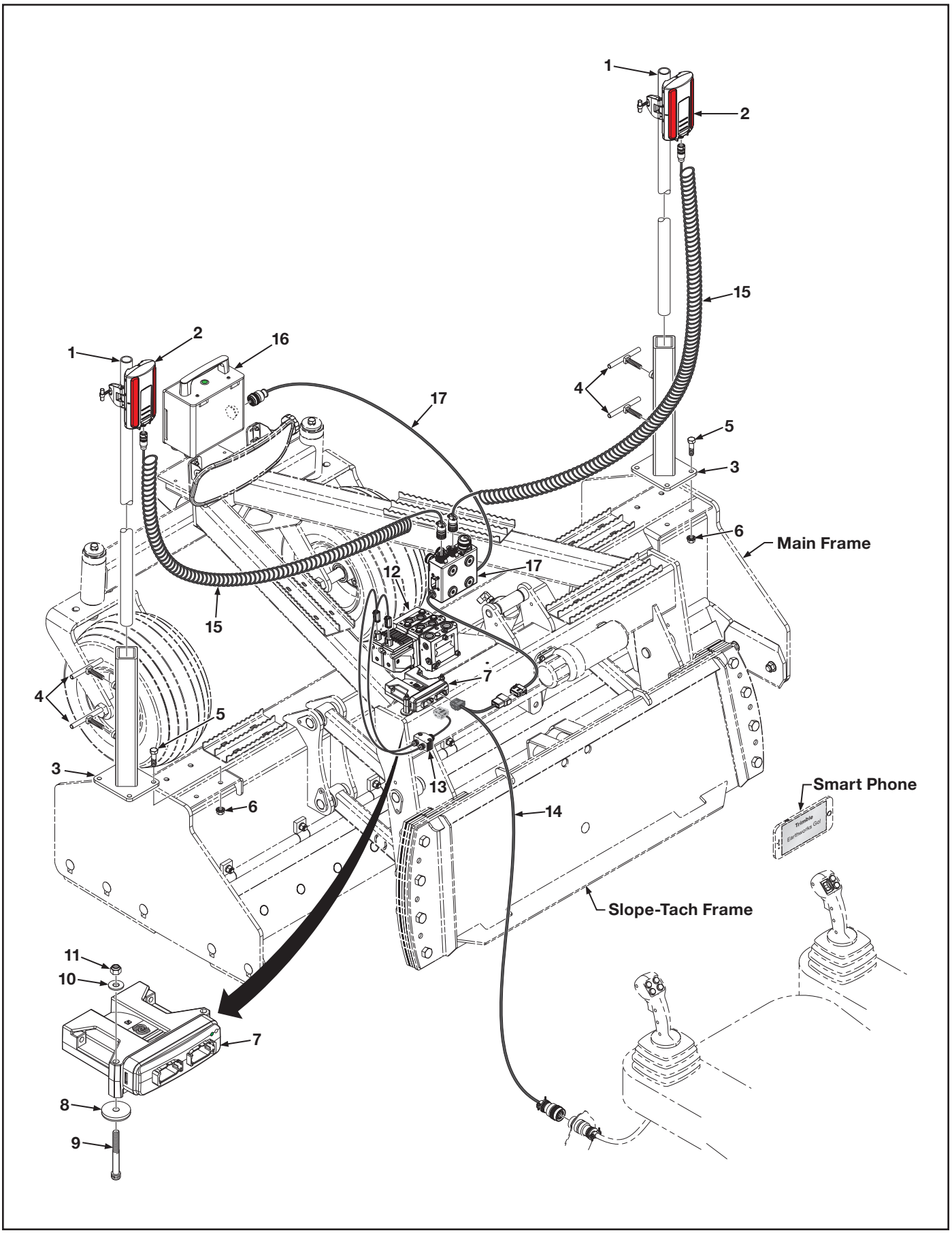

Figure 9-8. Laser Controls and Related Parts - Trimble Earthworks Go!

Item	Part No.	Qty	Description
1	001-001-146	2	Pole, Mast, Black, 1-3/4" Dia x 7' Long
2	000-200-472	2	Receiver, Laser 360°, Trimble
3	315-101-700	2	Mount, Mast Pole
4	001-001-053	4	Handle, Tee
5	000-150-375	8	Bolt, Hex Head, 1/2"-13UNC x 1-1/4" Long
6	000-158-111	8	Nut, Serrated Flange, 1/2"-13UNC
7	000-200-399	1	Module, Valve Control, Includes Items 8 thru 11
8	001-001-164	2	Magnet, Round, 1-1/4" Dia.
9	000-150-392	2	Bolt, Socket Head, #10-24UNC x 2-1/4" Long
10	000-155-016	2	Washer, Flat, #10 USS
11	000-158-026	2	Nut, Hex, Nylon Lock, #10-24UNC
12	000-166-812	1	Valve Assembly, Hydraulic, PVE32H
13	000-200-368	1	Cable, Valve Module, Dual
14		1	Harness, Loader (Machine Specific)
15	000-200-505	2	Cable, Receiver, Coiled
16	000-200-506	1	Go! Box, Trimble Earthworks, Includes Item 17
17	000-200-504	1	Box, Junction & Harness

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Figure 9-9. Box, Laser Receiver 360°, Cables - Trimble Earthworks Go!

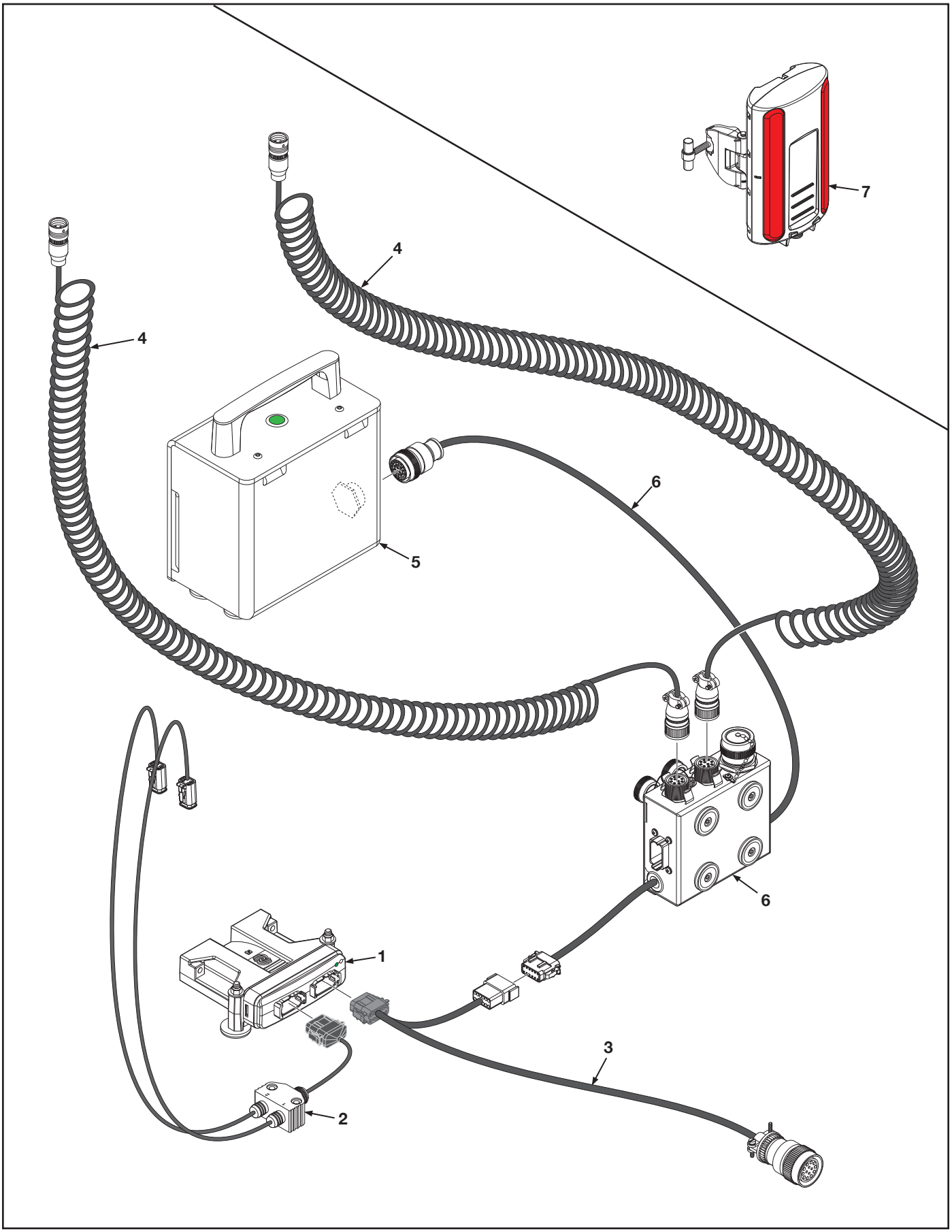

Figure 9-9. Box, Laser Receiver 360°, Cables - Trimble Earthworks Go!

Item	Part No.	Qty	Description
1	000-200-399	1	Module, Valve Control
2	000-200-368	1	Cable, Valve Module, Dual
3		1	Harness, Loader (Machine Specific)
4	000-200-505	2	Cable, Receiver, Coiled
5	000-200-506	1	Go! Box, Trimble Earthworks, Includes Item 6
6	000-200-504	1	Box, Junction & Harness
7	000-200-472	2	Receiver, Laser 360°, Trimble

Figure 9-10. Decals

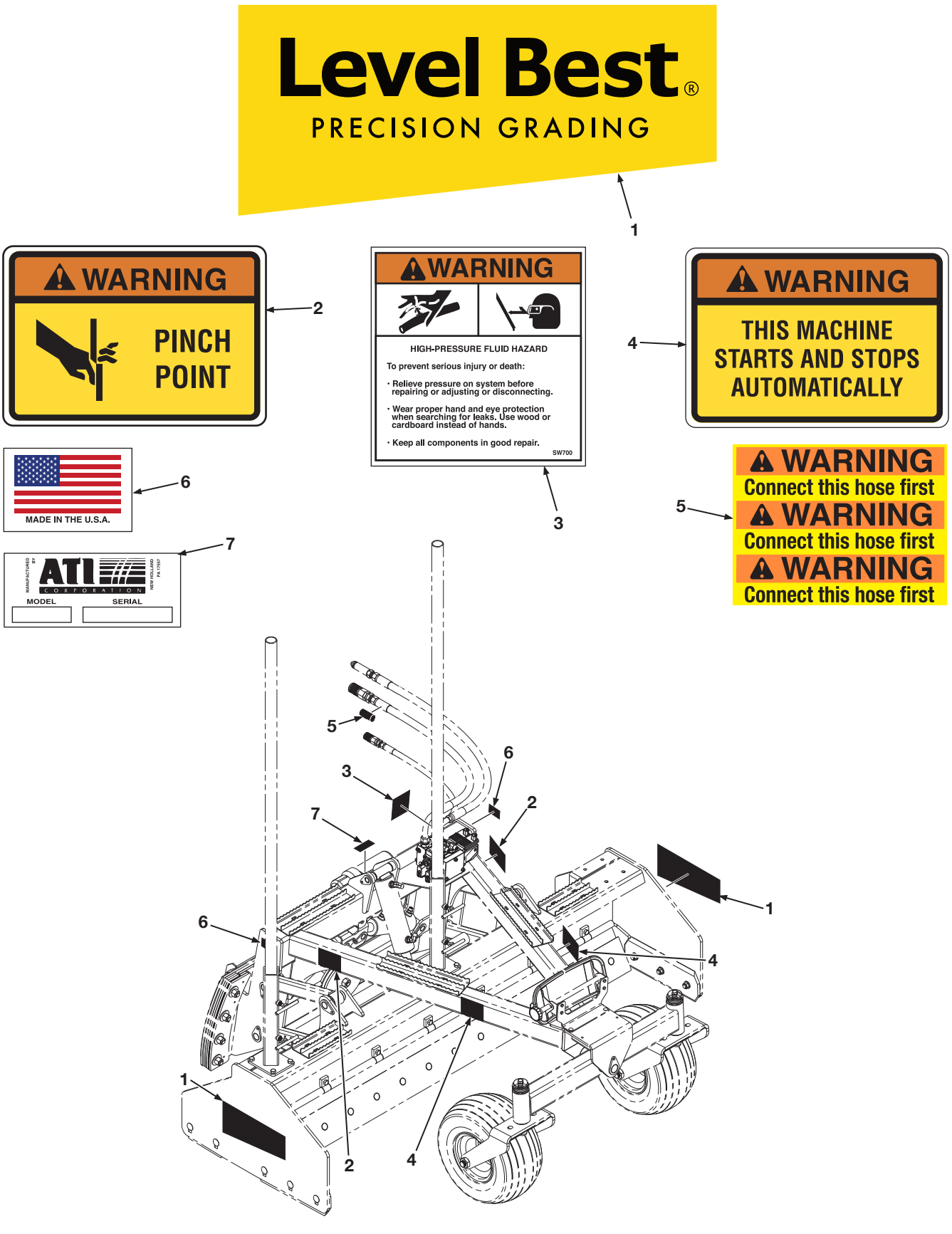

Figure 9-10. Decals

Item	Part No.	Qty	Description
1	000-186-102	2	Decal, Level Best Logo
2	000-186-055	2	Decal, Danger, Pinch Point
3	000-186-041	1	Decal, Warning, High-Pressure
4	000-186-094	2	Decal, Danger, This Machine Starts & Stops Automatically
5	000-186-100	1	Decal, Warning, Connect Hose First
6	000-186-092	2	Decal, Made in U.S.A.
7	000-186-035	1	Plate, Model/Serial, Adhesive Back

(for future use)

INDEX

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